

KK  
TWO SECTIONS

JANUARY, 1939

SECTION 2

# S · A · E JOURNAL



Index to Volumes 42 and 43

JANUARY-DECEMBER, 1938

Society of Automotive Engineers, Inc.

29 West 39th Street

New York

---

---

**T**HE Index for the Transactions Section of the SAE Journal for 1938 is printed on the following pages. Page numbers for this Section are consecutive from January to December. The table below indicates the pages contained in each issue:

|           |         |
|-----------|---------|
| January   | 1-48    |
| February  | 49-88   |
| March     | 89-136  |
| April     | 137-184 |
| May       | 185-228 |
| June      | 229-268 |
| July      | 269-304 |
| August    | 305-348 |
| September | 349-392 |
| October   | 393-440 |
| November  | 441-484 |
| December  | 485-528 |

---

Following the Transactions Index there is printed the General Editorial Section Index.

# Index to Transactions

## Author Index

| AUTHOR  | TITLE OF PAPER   | PAGE    |
|---|--|---------|
| Abbott, Ernest J.                                     | New Technique for Noise Reduction  | 170     |
| Anglada, Joseph A.                                    | Development and Trend in Truck Design  | (E) 62  |
| Anglada, Joseph A.                                    | Trend in Truck-Engine Design   | (E) 62  |
| Bachman, B. B.  | Engineering Facts in Support of the Camel-Back Truck                                 | (E) 3   |
| Bachman, B. B.  | In Support of the Camel-Back Truck   | (E) 3   |
| Bachman, B. B.  | Modern Conditions Demand Modern Trucks   | 118     |
| Baker, Carl F.  | Propeller Problems Imposed by Substratosphere Flight                                 | 285     |
| Bartholomew, Earl; Harold Chalk and Benjamin Brewster | Carburetion, Manifolding and Fuel Antiknock Value                                    | 141     |
| Baxley, C. H., and T. B. Rendel                       | Report of the Volunteer Group for Compression-Ignition Fuel Research                 | 27      |
| Beall, A. L., and L. M. Townsend                      | Hi-Duty Spark-Plug Testing   | 465     |
| Becker, A. E.   | Effect of Test Conditions on Fuel Rating   | 63      |
| Berger, A. L., and Opie Chenoweth                     | Supercharger Installation Problems   | 472     |
| Blackwood, A. J.; C. B. Kass and G. H. B. Davis       | A Practical Approach to the Road Detonation Problem                                  | 427     |
| Boden, E. G.  | Deflection Tests of Axles and Transmissions  | 504     |
| Boyd, T. A.   | 1937 Road Knock Tests; Report from Cooperative Fuel Research Committee               | 244     |
| Brady, George W.                                      | Aerodynamic Considerations Affecting Propellers for Large Engines                    | 293     |
| Brady, George W.                                      | Aircraft Propellers of the Future  | (E) 426 |
| Brady, George W.                                      | Trend of Controllable Propeller Requirements   | (E) 426 |
| Brewster, Benjamin; Earl Bartholomew and Harold Chalk | Carburetion, Manifolding and Fuel Antiknock Value                                    | 141     |
| Buck, Richard S., and A. Lewis MacClain               | Flight-Testing with an Engine Torque Indicator                                       | 49      |
| Campbell, John M., and W. G. Lovell                   | Application of Statistical Concepts to the Knock-Rating Problem                      | 421     |
| Campbell, Kenneth                                     | Cylinder Cooling and Drag of Radial Engine Installations                             | 515     |
| Chalk, Harold; Earl Bartholomew and Benjamin Brewster | Carburetion, Manifolding and Fuel Antiknock Value                                    | 141     |
| Chenoweth, Opie, and A. L. Berger                     | Supercharger Installation Problems   | 472     |
| Child, L. W.  | Air Conditioning of Automobiles and Buses  | 263     |
| Collins, P. A., and J. M. Crawford                    | Experimental Procedure of Testing and Organization                                   | 455     |
| Colwell, A. T.  | Wear Reduction of Valves and Valve Gear  | 366     |
| Connor, Kirke W.                                      | Surface Finish Related to Wear in Internal-Combustion Engines                        | 305     |
| Crawford, J. M., and P. A. Collins                    | Experimental Procedure of Testing and Organization                                   | 455     |
| Critchfield, R. M.                                    | Effect of Application on Maintenance of Automotive Electrical Equipment              | 403     |
| Cumming, W. J.  | Fleet-History - A Maintenance Guide  | 87      |
| Cummings, H. K.                                       | Rating Aviation Fuels in Full-Scale Aircraft Engines                                 | 497     |
| Davis, G. H. B.; A. J. Blackwood and C. B. Kass       | A Practical Approach to the Road Detonation Problem                                  | 427     |
| DeFlorez, Luis  | Operating Costs of Planes, Cars, and Boats   | (E) 262 |
| DeFlorez, Luis  | Private Flying   | (E) 262 |
| Driggs, Ivan H.                                       | Airplane Performance Calculations by Means of Logarithmic Graphs                     | 253     |
| Drinkard, W. E., and J. B. Macauley, Jr.              | Spark Advance and Octane Number - A Road-Test Technique                              | 436     |
| Fedden, A. H. R.                                      | The Single Sleeve as a Valve Mechanism for the Aircraft Engine                       | 349     |
| Foster, Arch L.                                       | Characteristics of Tomorrow's Lubricants; Sources and Technology of Super-Lubricants | (E) 312 |
| Foster, Arch L.                                       | Tomorrow's Lubricants  | (E) 312 |
| Foster, H. H.; and E. G. Whitney                      | The Diesel as a High-Output Engine for Aircraft                                      | 161     |
| Gaylord, R. P.  | The Traction of Pneumatic Tractor Tires  | 13      |
| Geschelin, Joseph                                     | An Appraisal of Current Progress in Automotive Manufacturing                         | (E) 100 |
| Geschelin, Joseph                                     | Classification of Machine Tools  | (E) 100 |
| Geschelin, Joseph                                     | Lubrication of Special Running-Gear Mechanism  | (E) 365 |
| Glynn, Frederick K.                                   | Survey of Special Running-Gear Lubrication   | (E) 365 |
|   | The Economics of Truck Selection   | 37      |

(E) indicates excerpt published.

# S.A.E. TRANSACTIONS

| AUTHOR  | TITLE OF PAPER  | PAGE |
|---|---|------|
| Hale, J. E.                                     | What Fleet Operators Should Know about Tires                          | 101  |
| Hanley, W. V., and J. R. MacGregor              | Diesel Deposits as Influenced by Fuels and Operating Conditions       | 272  |
| Harvey, W. G.                                   | Manufacture, Characteristics and Uses of Magnesium Castings           | 43   |
| Haynes, R. B.                                   | Recent Developments in Spline and Gear Cutting and Finishing          | 1    |
| Hazen, R. M., and O. V. Montieth                | Torsional Vibration of In-Line Aircraft Engines                       | 335  |
| Heath, Howard J., and Kent R. Van Horn          | Quality Control of Aluminum-Alloy Aircraft Castings                   | 4    |
| Horine, Merrill C.                              | Truck Performance   | 342  |
| Hutchinson, Roland V.                           | Do We Understand the Grinding Process?                                | 89   |
| Janeway, R. N.                                  | Quantitative Analysis of Heat Transfer in Engines                     | 371  |
| Kass, C. B.; A. J. Blackwood and G. H. B. Davis | A Practical Approach to the Road Detonation Problem                   | 427  |
| Kuhn, Paul                                      | Bending Stresses in Box Beams as Influenced by Shear Deformation      | 319  |
| Lampton, G. T.                                  | Propeller Factors Tending to Limit Aircraft-Engine Powers             | 289  |
| Lansing, R. P.                                  | The Accessory-Drive Problem of Aircraft Engines                       | 205  |
| Laurie, Gavin W.                                | Maintenance of a Concentrated Fleet of Large Trucks                   | 123  |
| Ledwinka, Joseph                                | Body and Chassis Development (E)                                      | 271  |
| Ledwinka, Joseph                                | Combined Body and Chassis Construction (E)                            | 271  |
| Lovell, W. G., and John M. Campbell             | Application of Statistical Concepts to the Knock-Rating Problem       | 421  |
| Macauley, J. B., Jr., and W. E. Drinkard        | Spark Advance and Octane Number - A Road-Test Technique               | 436  |
| MacClain, A. Lewis, and Richard S. Buck         | Flight-Testing with an Engine Torque Indicator                        | 49   |
| MacGregor, J. R., and W. V. Hanley              | Diesel Deposits as Influenced by Fuels and Operating Conditions       | 272  |
| Mathews, H. O.                                  | Maintenance of a Scattered Fleet                                      | 281  |
| McCloud, J. L.                                  | Synthetic-Resin Enamel Finishes                                       | 131  |
| Montieth, O. V., and R. M. Hazen                | Torsional Vibration of In-Line Aircraft Engines                       | 335  |
| Moxey, J. G.                                    | Semi-Trailers Versus Six-Wheelers                                     | 77   |
| Paton, C. R.                                    | Ride Controls and Calibration   | 313  |
| Perkins, Kendall                                | Advantages of Stratosphere Flight (E)                                 | 402  |
| Perkins, Kendall                                | High-Flight Engineering (E)   | 402  |
| Plumb, Ralph A.                                 | The Supercharger - Its Progress and Prospects (E)                     | 26   |
| Prupton, C. F., and A. O. Willey                | Testing of Hypoid Lubricants  | 325  |
| Pyles, Russell                                  | Diesel Supercharging - Its Effect on Design and Performance           | 215  |
| Rabazzana, Hector                               | Some Factors Controlling Part-Load Economy                            | 511  |
| Rassweiler, Gerald M., and Lloyd Withrow        | Motion Pictures of Engine Flames Correlated with Pressure Cards       | 185  |
| Rendel, T. B.                                   | Developments in Diesel Engines (E)                                    | 42   |
| Rendel, T. B.                                   | Fuels for High-Speed Diesel Engines (E)                               | 42   |
| Rendel, T. B., and C. H. Baxley                 | Report of the Volunteer Group for Compression-Ignition Fuel Research  | 27   |
| Round, G. A.                                    | Why Drain Crankcases and When   | 301  |
| Sabina, J. R.                                   | Correlation of Road and Laboratory Octane Numbers                     | 416  |
| Schon, Pierre                                   | March of Progress in the Development of Transportation                | 381  |
| Shoemaker, F. G.                                | Automotive Two-Cycle Diesel Engines                                   | 485  |
| Shogran, Ivar L.                                | Engine Installation and Related Problems in Large Aircraft            | 225  |
| Shogran, Ivar L.                                | Engine Installations (E)  | 48   |
| Snead, J. L. S., Jr.                            | Truck Maintenance Problems  | 157  |
| Sparrow, Stanwood W.                            | Safe Viscosity for a Motor-Car Engine Lubricant                       | 393  |
| Taub, Alex                                      | Motor-Car Engines in England  | 229  |
| Teetor, Macy O.                                 | The Reduction of Piston-Ring and Cylinder Wear                        | 137  |
| Thompson, J. Trueman                            | The Outlook on Legal Performance Requirements                         | 209  |
| Toulmin, H. A., Jr.                             | Industrial Mobilization and Its Contribution to the Making of War (E) | 334  |

(E) indicates excerpt published.



## AUTHOR INDEX

| AUTHOR                                   | TITLE OF PAPER  | PAGE    |
|--|---|---------|
| Toulmin, H. A., Jr.                      | Industrial Mobilization for War                                     | (E) 334 |
| Townsend, L. M., and A. L. Beall         | Hi-Duty Spark-Plug Testing  | 465     |
| Underwood, Arthur F.                     | Automotive Bearing Materials and Their Application                  | 385     |
| Van Halteren, A. S.                      | Fundamentals of Heat Transmission Applied to Automotive Brakes      | 269     |
| Van Horn, Kent R., and Howard J. Heath   | Quality Control of Aluminum-Alloy Aircraft Castings                 | 4       |
| Wallace, D. A.                           | Purchasing, Planning, and Scheduling for Multiple-Model Automobiles | 73      |
| Watson, R. A.                            | Engine Bearing Processing and Its Effects                           | (E) 384 |
| Watson, R. A.                            | Processing Engine Bearings  | (E) 384 |
| Whitney, E. G.; and H. H. Foster         | The Diesel as a High-Output Engine for Aircraft                     | 161     |
| Willey, A. O., and C. F. Prutton         | Testing of Hypoid Lubricants  | 325     |
| Withrow, Lloyd, and Gerald M. Rassweiler | Motion Pictures of Engine Flames Correlated with Pressure Cards     | 185     |
| Wolf, Austin M.                          | Trends in Design of 1939 Cars                                       | 441     |

## Discusser Index

| DISCUSSEUR         | PAGE          | DISCUSSEUR        | PAGE     | DISCUSSEUR           | PAGE     |
|--------------------|---------------|-------------------|----------|----------------------|----------|
| Barish, Thomas     | 510           | Jackson, L. B.    | 496      | Pyles, Russell       | 224      |
| Biermann, David    | 261           | Jacobi, L.        | 509      | Reid, Elliott G.     | 261      |
| Bixby, L. A.       | 509           | Janeway, R. N.    | 242      | Rendel, T. B.        | 434      |
| Blackwood, A. J.   | 156; 435      | Kass, C. B.       | 435      | Retzlaff, W. G.      | 85       |
| Childs, W. F., Jr. | 214           | Keese, B. W.      | 509      | Roensch, Max M.      | 242      |
| Colwell, A. T.     | 363           | Kemper, Carlton   | 364      | Schweitzer, P. H.    | 496      |
| Davis, G. H. B.    | 435           | Kishline, F. F.   | 243      | Sparrow, Stanwood W. | 242      |
| Dennison, E. S.    | 496           | Lemon, B. J.      | 117      | Tector, Macy O.      | 243      |
| Driggs, Ivan H.    | 261           | Loomis, Peter     | 184      | Tilley, N. N.        | 365      |
| Eisinger, J. O.    | 426, 433, 440 | Mock, Frank C.    | 363      | Wagstaff, W. A.      | 183      |
| Glade, Peter       | 169           | Moore, Charles S. | 223      | Whitney, Ernest G.   | 495      |
| Gregory, A. T.     | 363; 528      | Nutt, Arthur      | 362; 484 | Wolf, Austin M.      | 86       |
| Hall, E. S.        | 169           | Owner, F. M.      | 527      | Worth, Weldon        | 528      |
| Hebl, L. E.        | 156           | Parkinson, J. S.  | 184      | Wright, T. P.        | 292, 300 |
| Heron, S. D.       | 363           | Puffer, S. R.     | 484      | Young, V. C.         | 364; 528 |
| Insley, Robert     | 168           |                   |          | Zand, Stephen J.     | 183      |

## Subject Index

## A

## Accidents and Accident Prevention

|                              |          |
|------------------------------|----------|
| Aircraft                     |          |
| Diesel engine effects        | 168      |
| Propeller weight effects     | 287      |
| Automobile                   |          |
| Brakes                       | 271      |
| Progress                     | 441      |
| Motor-truck                  |          |
| Highway hazards              | 383      |
| Other vehicles compared with | 383, 384 |
| Preventives                  | 160      |
| Road factor                  | 214; 384 |
| Traffic control factor       | 384      |

## Aircraft Design and Construction

|  |                         |
|--|-------------------------|
| AERODYNAMIC CONSIDERATIONS AFFECTING PROPELLERS<br>FOR LARGE ENGINES | 293                     |
| AIRCRAFT PROPELLERS OF THE FUTURE                                    | 426                     |
| AIRPLANE PERFORMANCE CALCULATIONS BY MEANS OF<br>LOGARITHMIC GRAPHS  | 253                     |
| BENDING STRESSES IN BOX BEAMS AS INFLUENCED BY SHEAR<br>DEFORMATION  | 319                     |
| ENGINE INSTALLATION AND RELATED PROBLEMS IN LARGE<br>AIRCRAFT        | 225                     |
| PROPELLER PROBLEMS IMPOSED BY SUBSTRATOSPHERE<br>FLIGHT              | 285                     |
| PROPELLER FACTORS TENDING TO LIMIT AIRCRAFT-ENGINE<br>POWERS         | 289                     |
| QUALITY CONTROL OF ALUMINUM-ALLOY AIRCRAFT CAST-<br>INGS             | 4                       |
| Altitude effects   | 285, 293, 297           |
| Box-beam problem   |                         |
| Analysis of  | 319, 320, 321, 324      |
| History  | 319                     |
| Shear deformation  | 319, 323, 324           |
| Shear stiffness factor   | 322                     |
| Stress distribution  | 319, 320, 321, 324      |
| Tests, strain-gage   | 321                     |
| Calculations, performance, by logarithmic graphs                     | 253                     |
| Cockpit  |                         |
| Design requirements  | 226                     |
| Instrument board   | 226, 227                |
| Controls   |                         |
| Emergency  | 227                     |
| Engine control system  | 227                     |
| Location   | 226                     |
| Engine installation problems   | 48; 225, 228            |
| Engine manufacturer relation to                                      | 515, 516, 519, 527      |
| Flying-boat weight-increase, advantages of                           | 289                     |
| Logarithmic graphs, performance calculations by                      | 253                     |
| Makes  |                         |
| Douglas  | 225; 524, 527           |
| Vought Corsair   | 50                      |
| Multi-engine   | 225; 285, 289, 292, 299 |
| Nacelle location   | 225                     |
| Performance calculations by logarithmic graphs                       | 253                     |
| Performance curves   |                         |
| Power available  | 255                     |
| Power required   | 255                     |
| Plastics used in   | 287                     |
| Production   |                         |
| Casting, magnesium   | 43, 47, 48              |
| Casting, sand  |                         |
| Cores  | 5                       |
| Cost factor  | 4                       |
| Limitations  | 4                       |
| Merits   | 4                       |
| Solidification   | 5                       |
| Structural variations  | 4, 5, 6                 |
| Magnesium castings   | 43, 47, 48              |
| Propellers   |                         |
| Aerodynamic considerations   | 293                     |
| Altitude effects   | 285, 297                |
| Autogyro rotor compared with   | 293                     |
| Blade area, increase in  | 286                     |

## Aircraft Design and Construction (Concluded)

|   |  |
|---|--|
| Blades                                  |  |
| Number of                               | 285, 286, 287, 288, 290, 291, 292, 293, 294, 295, 296, 297; 426  |
| Pitch distribution                      | 294, 298, 299  |
| Plan form                               | 294  |
| Width                                   | 294  |
| Clearance, tip                          | 294, 300   |
| Constant-speed, performance calculation | 257, 258   |
| Control means                           | 426  |
| Design, increased power relation to     | 285, 289   |
| Diameter                                | 285, 286, 287, 288, 290, 291, 293, 294, 295, 296, 297, 298, 299, 300; 426  |
| Efficiency                              |  |
| Calculation                             | 257  |
| Static thrust                           | 295, 296   |
| Feathering                              | 299  |
| Fixed-pitch, performance calculated     | 255, 257, 259  |
| Future predicted                        | 426  |
| Gear ratio                              | 294, 295   |
| Makes                                   |  |
| Curtiss                                 | 298, 299   |
| Hamilton Standard                       | 50; 225; 256   |
| Performance calculation                 | 255  |
| Pitch range                             | 426  |
| Reduction gearing                       | 285, 286, 288, 297, 298, 300; 426  |
| Requirements, future                    | 426  |
| Selection, factors affecting            | 294, 298, 300  |
| Shank fairing                           | 294, 299   |
| Take-off affected by                    | 295  |
| Thrust, static                          | 295, 296, 297  |
| Tip clearance                           | 294, 300   |
| Torque reaction                         | 299  |
| Variable-pitch                          | 426  |
| Vibration insulation                    | 293  |
| Weight                                  |  |
| Blade-number effects                    | 291  |
| Engine-rating relation to               | 287, 288   |
| Engine size affected by                 | 290, 291   |
| Importance of                           | 293  |
| Material effects                        | 287  |
| Power relation to                       | 286, 287   |
| Prediction of                           | 293  |
| Reduction                               |  |
| Methods                                 | 287, 293   |
| Need for                                | 292  |
| Safety factor                           | 287  |
| Specific                                | 287, 300   |
| Trends                                  | 285, 287, 290, 300   |
| Single-engine                           | 286  |
| Size trends                             | 225  |
| Speed trends                            | 515  |
| Stresses                                | 319, 320, 321, 322, 323, 324   |
| Weight trends                           | 285, 289   |
| Wings, box-beam problem analyzed        | 319, 322, 324  |
| See also                                | Accidents and Accident Prevention, Aircraft; Aircraft Operation and Performance; Aviation; Engines, Aircraft; and Instruments, Aircraft) |

# SUBJECT INDEX

|  | PAGE  |  | PAGE                    |
|--|---|--|-------------------------|
| <b>Aircraft Operation and Performance (Concluded)</b>  |   | <b>Automobile Design and Construction (Concluded)</b>  |                         |
| Calculation  | 294   | Experimental engineer relation to  | 457                     |
| Data on  | 290   | Problems   | 457, 458                |
| Factors affecting  | 285   | Production engineer relation to  | 456                     |
| Tip speed effects  | 286, 289, 300   | Testing  | 458, 459, 464           |
| Engine speed relation to   | 297   | Plastics used in   | 449                     |
| Feathering   | 299   | Production   |                         |
| Makes, Hamilton  | 50  | PURCHASING, PLANNING, AND SCHEDULING FOR MULTIPLE-   |                         |
| Power requirements   | 287   | MODEL AUTOMOBILES  | 73                      |
| Speed effects  | 290   | Multiple-model   |                         |
| Thrust, static   | 61, 295, 296, 297                                     | Assembling for shipment  | 74, 75                  |
| Types compared, tandem vs. single-rotating   | 300   | Coordination, importance of  | 73, 74, 76              |
| Vibration  |   | Engineering Department relation to   | 73                      |
| Prevention methods   | 287   | Follow-up system   | 74, 76                  |
| Stresses caused by   | 287   | Inventory control  | 76                      |
| Weight effects   | 291   | Machining Department relation to   | 75                      |
| Windmilling  | 299   | Material handling  | 74, 75, 76              |
| Speed  |   | Painting operations  | 75, 76                  |
| Air-fuel mixture ratio effects   | 59  | Planning Department relation to  | 73, 76                  |
| Cowling effects  | 56  | Problems   | 73, 74                  |
| Propeller effects  | 295, 297, 299   | Program outlined   | 73                      |
| Take-off   |   | Purchasing Department relation to  | 73                      |
| Data   | 295, 296, 297   | Sales Department relation to   | 73                      |
| Propeller effects  | 295   | Scheduling   | 73, 74, 76              |
| Testing, engine torque indicator used  | 60, 61  | Shipment, assembling for   | 74, 75                  |
| (See also Accidents and Accident Prevention, Aircraft; Aircraft Design and Construction; Aviation; Engines, Aircraft; and Instruments, Aircraft) |   | Time element   | 76                      |
|  |   | Progress   | 441                     |
| <b>Aluminum and Aluminum Alloys</b>  |   | Propeller shafts, progress   | 446                     |
| Aircraft use of  | 4   | Ride control, design effects   | 313                     |
| Casting  | 4   | Rubber, synthetic, used in   | 443                     |
| Engine, aircraft, use  | 11  | Rubber used in   | 447, 448                |
| Magnesium compared with  | 44, 47  | Spring rate  | 528                     |
| Pistons  | 495   | Torque members   | 447                     |
| Tensile properties, importance of  | 12  | Trends   | 441                     |
|  |   | Weight trends  | 441                     |
| <b>American Association of State Highway Officials</b>   | 343; 382  | Wheelbases   | 441                     |
| <b>American Society for Testing Materials</b>  | 137; 453  | (See also Accidents and Accident Prevention, Automobile; Automobile Operation and Performance; Axles; Bodies; Brakes; Clutches; Engine Design and Construction; Finishes; Foreign Design and Operation; Frames; Gears; Generators; Head-Lighting; Production; Riding-Qualities; Shock-Absorbers; Springs, Suspension; Steering Systems; Tires and Rims; and Transmissions) |                         |
| <b>American Society of Heating and Ventilating Engineers</b>   | 263, 266  |  |                         |
| <b>Army</b>  |   | <b>Automobile Operation and Performance</b>  |                         |
| Industry's relation to   | 334   | Electrical equipment, maintenance affected by  | 403, 415                |
| Motor vehicle tests planned  | 213   | Maintenance, electrical equipment effects  | 403, 415                |
| War, industrial mobilization for   | 334   | Operating costs  |                         |
| War prevention   | 334   | Airplane compared with   | 262                     |
|  |   | Data on  | 262                     |
| <b>Automobile Design and Construction</b>  |   | Motor-boat compared with   | 262                     |
| EXPERIMENTAL PROCEDURE OF TESTING AND ORGANIZATION   | 455   | Progress   | 441                     |
| TRENDS IN DESIGN OF 1939 CARS  | 441   | Ride problems analyzed   | 313                     |
| Air conditioning   | 263   | Tires, data on   | 101                     |
| Appearance   | 441   | (See also Accidents and Accident Prevention, Automobile; Automobile Design and Construction; Axles; Bodies; Brakes; Clutches; Engine Operation and Performance; Fleet Operation; Generators; Lubricants and Lubrication; Riding-Qualities; Shock-Absorbers; Springs, Suspension; Steering Systems; Tires and Rims; and Transmissions)                                      |                         |
| Bumpers  | 449   |  |                         |
| Electrical equipment   | 403, 415; 444   | <b>Automobile Manufacturers Association</b>  | 209; 343; 344           |
| Equipment progress   | 449   | <b>Automotive Industry</b>   |                         |
| Finishes, synthetic-resin enamel   |   | Economic influence   | 118                     |
| Durability   | 131, 132  | Machine-tool types used in   | 100                     |
| Time saving  | 131   | Progress   | 118                     |
| Horns  | 449   | <b>Aviation, Commercial</b>  |                         |
| Improvements classified  | 441   | Supercharger contribution to   | 26                      |
| Makes  |   | (See also Accidents and Accident Prevention, Aircraft; Aircraft Design and Construction; Aircraft Operation and Performance; Engines, Aircraft; and Instruments, Aircraft)   |                         |
| Bantam   | 451   |  |                         |
| Buick  | 441, 444, 445, 446, 447, 448, 449, 450, 451; 528      | <b>Axles</b>   |                         |
| Cadillac   | 262; 316; 441, 444, 446, 447, 448, 449, 450, 451      | DEFLECTION TESTS OF AXLES AND TRANSMISSIONS  | 504                     |
| Chevrolet  | 229; 328, 329; 441, 444, 445, 447, 448, 449, 450, 455 | Failure causes   | 159; 505, 506, 507, 508 |
| Chrysler   | 73; 316; 441, 444, 445, 446, 447, 448, 449, 450, 451  | Front, maintenance problems  | 159                     |
| De Soto  | 444, 445, 446, 451                                    | Gear mounting, importance of   | 504                     |
| Dodge  | 441, 444, 445   | Motor-truck, maintenance problems  | 159                     |
| Ford   | 132; 229, 262; 441, 447, 449, 450                     | Rear   |                         |
| Graham   | 445, 446, 449, 450, 451                               | Lubrication, extreme-pressure  | 365                     |
| Hudson   | 445, 447, 448, 449, 450, 451                          | Progress   | 446, 447                |
| Hupmobile  | 441, 446, 449   | Reduction gears, hypoid  | 446                     |
| La Salle   | 316; 444, 448, 450                                    | Tractor, deflection tests  | 505, 507                |
| Lincoln  | 132; 448, 449, 450, 451                               |  |                         |
| Nash   | 316; 441, 445, 446, 449, 450                          |  |                         |
| Oldsmobile   | 441, 444, 445, 446, 447, 448, 449, 450                |  |                         |
| Overland   | 441, 449, 450   |  |                         |
| Packard  | 316, 328; 441, 445, 446, 447, 448, 449, 450, 451      |  |                         |
| Plymouth   | 229; 441, 445, 451                                    |  |                         |
| Pontiac  | 441, 445, 446, 447, 448, 449, 450, 451                |  |                         |
| Studebaker   | 441, 445, 446, 447, 448, 449, 450                     |  |                         |
| Vauxhall   | 229, 242  |  |                         |
| Model, new   |   |  |                         |
| Design engineer relation to  | 456   |  |                         |
| Development procedure  | 456, 457  |  |                         |

# S.A.E. TRANSACTIONS

|  | PAGE                    |  | PAGE                                   |
|--|-------------------------|--|--|
| <b>B</b>   |                         | <b>Bodies (Concluded)</b>                          |  |
| <b>Batteries</b>                                   |                         | Motor-truck, maintenance                           | 160                                    |
| Connections and wiring                             | 407, 408                | Production   |  |
| Location   | 407; 444                | Painting   |  |
| Maintenance  | 407                     | Operations involved                                | 75, 76                                 |
| Progress   | 444                     | Paint recovery                                     |  |
| Selection, factors involved                        | 407                     | Progress   | 76                                     |
| Size   | 403                     | Savings from                                       | 76                                     |
| Starting requirements                              | 413                     | Scheduling of                                      | 75, 76                                 |
| Wiring and connections                             | 407, 408                | Time element                                       | 76                                     |
|  |                         | Progress   | 441, 450, 451                          |
| <b>Bearings</b>                                    |                         | Radiator grilles                                   | 450                                    |
| AUTOMOTIVE BEARING MATERIALS AND THEIR APPLICATION | 385                     | Running boards                                     | 450, 451                               |
| ENGINE BEARING PROCESSING AND ITS EFFECTS          | 384                     | Seats  |  |
| Engine   |                         | Cushions   | 451                                    |
| Corrosion  | 386, 387, 388           | Progress   | 451                                    |
| Diesel   | 385, 391                | Sunshine top                                       | 450                                    |
| Failure  |                         | Ventilation, progress                              | 449                                    |
| Causes   | 158                     | Windshields  |  |
| Oil pressure effects                               | 395, 396                | Progress   | 450                                    |
| Oil viscosity relation to                          | 395, 396, 399           | Wipers   | 450                                    |
| Temperature effects                                | 395, 396, 399           |  |  |
| Fatigue  | 385, 386                | <b>Brakes</b>                                      |  |
| Metals   | 385, 388                | FUNDAMENTALS OF HEAT TRANSMISSION APPLIED TO AUTO- |  |
| Production problems                                | 384                     | MOTIVE BRAKES                                      | 269                                    |
| Trends   | 392                     | Drums  |  |
| Wear causes  | 392                     | Production   | 447                                    |
| Lubrication, oil viscosity requirements            | 395, 396, 399           | Temperature data                                   | 270, 271                               |
| Metal  |                         | Fading, reduction of                               | 447                                    |
| Antimony lead                                      | 317                     | Heat transmission problems                         |  |
| Babbitt  |                         | Amount of heat generated                           | 269                                    |
| Copper-lead compared with                          | 391                     | Analysis of  | 269                                    |
| Lead-base  | 388                     | Calculations                                       | 269, 270                               |
| Test machine described                             | 385, 386                | Formulas   | 269, 270                               |
| Tin-base   | 388                     | Heat dissipation                                   | 271                                    |
| Bronze   | 317                     | Heat flow  | 269, 270, 271                          |
| Cadmium  |                         | Importance of                                      | 269                                    |
| Cost factor  | 389                     | Hydraulic, progress                                | 447                                    |
| Merits   | 389, 390                | Motor-truck, maintenance problems                  | 159                                    |
| Copper-lead  |                         | Progress   | 447                                    |
| Applications                                       | 391, 392                | Trends   | 269                                    |
| Babbitt compared with                              | 391                     | Ventilation, internal                              | 271                                    |
| Bonding  | 387, 391                | Wheel cover effects                                | 271                                    |
| Scoring  | 386, 387                |  |  |
| Improvement needed, reasons for                    | 385                     | <b>Bureau of Public Roads</b>                      | 86; 209; 382                           |
| Production problems                                | 384                     |  |  |
| Properties desirable                               | 385, 386, 387, 388, 392 | <b>Bus</b>   |  |
| Silver   |                         | (See Motorcoach)                                   |  |
| Cost factor  | 390, 391                |  |  |
| Properties   | 390                     |  |  |
| Rubber   | 317                     |  |  |
| Wear, oil viscosity relation to                    | 395, 396, 399           |  |  |
|  |                         | <b>C</b>   |  |
| <b>Bodies</b>                                      |                         | <b>Camshafts</b>                                   |  |
| AIR CONDITIONING OF AUTOMOBILES AND BUSES          | 263                     | Progress   | 442                                    |
| BODY AND CHASSIS DEVELOPMENT                       | 271                     |  |  |
| Air conditioning                                   |                         | <b>Carburetors and Carburetion</b>                 |  |
| Air leakage  | 264                     | MOTOR-CAR ENGINES IN ENGLAND                       | 229                                    |
| Control mechanism                                  | 268                     | Air-fuel mixture ratio                             |  |
| Cooling  | 267                     | Detonation affected by                             | 142, 143, 144, 146, 148, 149, 150, 155 |
| Definition   | 263                     | Engine wear affected by                            | 231                                    |
| Heating  | 265                     | Exhaust gas effects                                | 235, 236, 242                          |
| Humidity   | 263, 268                | Fuel consumption affected by                       | 235, 242, 243; 511, 512                |
| Problems involved                                  | 263, 264                | Ignition timing relation to                        | 235                                    |
| Refrigerating system                               |                         | Load effects                                       | 511                                    |
| Principles   | 268                     | Mixture distribution factor                        | 237, 238                               |
| Selection  | 268                     | Spark-plug gap relation to                         | 237                                    |
| Ventilating  | 264, 266                | Temperature relation to                            | 235, 236, 237                          |
| Chassis unit construction with                     |                         | Valve timing relation to                           | 235, 242                               |
| Future predicted                                   | 271                     | Calibration  | 238, 239, 240                          |
| Merits   | 271                     | Carburetor engineer's problems                     | 463, 464                               |
| Doors, progress                                    | 451                     | Carburetor location with respect to supercharger   | 472                                    |
| Equipment progress                                 | 451                     | <b>Choke</b>                                       |  |
| Fenders  | 450, 451                | Automatic  | 142, 152; 443                          |
| Heating, progress                                  | 449                     | Manual   | 152                                    |
| Hoods  |                         | Downdraft  | 142                                    |
| Alligator  | 450                     | Economizers  | 240                                    |
| Progress   | 450                     | Flow-box charts                                    | 240, 241                               |
| Instrument panels                                  | 449                     | Fundamental problems                               | 234, 235                               |
| Luggage compartments                               | 451                     | Makes  |  |
| Motorcoach   |                         | Carter   | 443                                    |
| Air conditioning                                   | 263, 264, 265; 452      | Chandler Groves                                    | 443                                    |
| Progress   | 452                     | Stromberg  | 443                                    |
|  |                         | Progress   | 443                                    |
|  |                         | Silencer effects                                   | 241                                    |



## SUBJECT INDEX

[illegible]



## S.A.E. TRANSACTIONS

|   |                                   |  |                              |
|---|-----------------------------------|--|------------------------------|
|   | PAGE                              |  | PAGE                         |
| <b>Detonation (Concluded)</b>                             |                                   | <b>Engine Design and Construction (Concluded)</b>                        |                              |
| Testing   |                                   | Diesel engine compared with  | 485, 486, 487, 495           |
| Aircraft fuel   |                                   | Exhaust system   | 443, 444                     |
| Engines used  | 498, 499                          | Fuel supply system, progress   | 443                          |
| Fuels used  | 498, 499, 500, 502, 503           | Lubrication  |                              |
| Future work outlined                                      | 501, 502                          | Oil filters  | 442                          |
| National Research Council of Canada                       | 498                               | Progress   | 442                          |
| Results summarized  | 500, 501                          | Makes  |                              |
| Cooperative Fuel Research method                          |                                   | Buick  | 442, 443, 444                |
| Aircraft fuel   | 497                               | Cadillac   | 442, 443, 444                |
| Correlation, laboratory and road                          | 416                               | Chevrolet  | 442, 443, 444, 462           |
| Engine modification                                       | 142                               | Chrysler   | 441, 442, 443, 444           |
| Road  | 141; 244                          | De Soto  | 443                          |
| Correlation, laboratory and road                          |                                   | Ford   | 444                          |
| Conclusions   | 420                               | Graham   | 442, 443                     |
| Method suggested  | 427, 435                          | Hudson   | 442                          |
| Methods criticized  | 427, 434                          | La Salle   | 442, 443                     |
| Object  | 417                               | Lincoln  | 442, 443                     |
| Participation   | 416                               | Oldsmobile   | 441, 442, 443                |
| Procedure   | 417                               | Overland   | 441                          |
| Ratings   | 155                               | Packard  | 441, 442, 443, 444           |
| Results   | 419                               | Plymouth   | 443                          |
| Data  |                                   | Pontiac  | 442, 443, 444                |
| Metropolitan area   | 428, 435                          | Studebaker   | 444                          |
| Southern area   | 429, 435                          | Model, new   |                              |
| Tabulation of   | 428, 429, 430                     | Development procedure  | 462                          |
| Instruments used in                                       | 142, 143, 154                     | Problems   | 462                          |
| Knock intensity effect                                    | 417, 423, 427, 428, 429, 434, 437 | Testing  | 462, 463                     |
| Knock intensity standardization needed                    | 433, 434                          | Mounting   |                              |
| Laboratory, Cooperative Fuel Research Engine modification | 142, 144                          | Progress   | 444                          |
| Engine variables  |                                   | Rubber   | 444                          |
| Air-fuel mixture temperature                              | 63, 68, 72                        | Progress   | 441, 442; 511                |
| Ignition, spark advance                                   | 63, 64, 66, 67, 68, 70, 71, 72    | Starters   |                              |
| Speed   | 63, 68, 72                        | Controls   | 415                          |
| Fuels used  | 63, 65, 72                        | Cranking motor application chart   | 415                          |
| Knock intensity, standard                                 |                                   | Engagement methods   | 413, 415                     |
| Data on   | 64, 65                            | (See also Bearings; Carburetors and Carburation; Crankshafts; Cylinders; |                              |
| Definition  | 63                                | Detonation; Engine Operation and Performance; Engines,                   |                              |
| Methods described   | 65, 69, 70                        | Aircraft; Engines, Diesel; Engines, Marine; Engines, Motor-              |                              |
| Octane number ratings                                     | 68                                | coach; Engines, Motor-truck; Foreign Design and Operation;               |                              |
| Reference fuels   | 66, 68, 72                        | Fuels; Gasoline; Generators; Ignition; Induction; Pistons;               |                              |
| Road test correlation with                                | 69; 141; 252; 416                 | and Valves and Valve-Gear)   |                              |
| Test conditions   | 70                                |  |                              |
| Laboratory, Ethyl Gasoline Corporation                    | 142                               |  |                              |
| Motor Method  | 417, 434                          |  |                              |
| Octane number rating                                      | 147, 156                          |  |                              |
| Procedure   | 147                               |  |                              |
| Reference fuels   | 147, 153, 154                     |  |                              |
| Research needed   | 156                               |  |                              |
| Road  |                                   |  |                              |
| Data  | 437, 438, 439, 440                |  |                              |
| Method described  | 436                               |  |                              |
| Road, Cooperative Fuel Research                           |                                   |  |                              |
| Atmospheric temperature effects                           | 247, 250                          |  |                              |
| Cars used   | 246, 247                          |  |                              |
| Fuels used  | 245                               |  |                              |
| History   | 244                               |  |                              |
| Laboratory test correlation with                          | 69; 141; 252; 416                 |  |                              |
| Octane number rating                                      | 247, 248, 249, 250, 251           |  |                              |
| Participation   | 244                               |  |                              |
| Procedure   | 246                               |  |                              |
| Significance of   | 252                               |  |                              |
| Statistical analysis                                      | 421, 425, 430                     |  |                              |
| E   |                                   |  |                              |
| <b>Economics</b>  |                                   | <b>Engine Operation and Performance</b>                                  |                              |
| Automotive industry relation to                           | 118                               | MOTION PICTURES OF ENGINE FLAMES CORRELATED WITH                         |                              |
| Motor-truck relation to                                   | 118                               | PRESSURE CARDS   | 185                          |
|   |                                   | MOTOR-CAR ENGINES IN ENGLAND   | 229                          |
|   |                                   | QUANTITATIVE ANALYSIS OF HEAT TRANSFER IN ENGINES                        | 371                          |
|   |                                   | SAFE VISCOSITY FOR A MOTOR-CAR ENGINE LUBRICANT                          | 393                          |
|   |                                   | SOME FACTORS CONTROLLING PART-LOAD ECONOMY                               | 511                          |
|   |                                   | SURFACE FINISH RELATED TO WEAR IN INTERNAL-COM-                          |                              |
|   |                                   | BUSTION ENGINES  | 305                          |
|   |                                   | WHY DRAIN CRANKCASES AND WHEN  | 301                          |
|   |                                   | Blowby   |                              |
|   |                                   | Curve, typical   | 232, 233                     |
|   |                                   | Oil viscosity effects  | 394, 395                     |
|   |                                   | Piston ring relation to  | 230, 232, 233, 234           |
|   |                                   | British problems   | 229                          |
|   |                                   | Cold weather operation, oil viscosity effects                            | 402                          |
|   |                                   | Combustion   |                              |
|   |                                   | Constant combustion chamber volume                                       | 198, 202                     |
|   |                                   | Deposits   | 514                          |
|   |                                   | Flame propagation  |                              |
|   |                                   | Flame velocity   | 202, 204                     |
|   |                                   | Motion picture studies   |                              |
|   |                                   | Data   | 186                          |
|   |                                   | Description  | 185, 186                     |
|   |                                   | Merits   | 185                          |
|   |                                   | Pressure cards correlated with   | 185                          |
|   |                                   | Testing  | 185                          |
|   |                                   | Heat balance   | 376, 377                     |
|   |                                   | Inflamed fractions of charge   | 198, 200, 201                |
|   |                                   | Inflamed volume  |                              |
|   |                                   | Method of determining  |                              |
|   |                                   | Description  | 189                          |
|   |                                   | Error, sources of  | 190                          |
|   |                                   | Merits   | 189                          |
|   |                                   | Pressure compared with   | 190, 203                     |
|   |                                   | Mass burned  |                              |
|   |                                   | Methods of calculating   | 190, 191, 192, 193, 194      |
|   |                                   | Pressure compared with   | 194, 195, 197, 198, 199, 202 |
|   |                                   | Piston-motion effects  | 190                          |

# SUBJECT INDEX

|   | PAGE                                   |  | PAGE   |
|---|--|--|--|
| <b>Engine Operation and Performance (Continued)</b> |  | <b>Engine Operation and Performance (Concluded)</b>                    |  |
| Pressure  |  | Part-load economy  | 511  |
| Combustion effects                                  | 195, 198                               | Power  |  |
| Inflamed volume compared with                       | 190, 203                               | Oil viscosity effects  | 393, 394   |
| Mass burned compared with                           | 194, 195, 197, 198, 199, 202           | Trends   | 441, 442   |
| Piston motion effects                               | 195                                    | Progress   | 511  |
| Pressure cards                                      |  | Running-in   | 401  |
| Data interpreted                                    | 195, 196, 197, 202                     | Starting   |  |
| Motion pictures correlated with                     | 185                                    | Battery requirements   | 413, 415   |
| Pressure scale                                      | 187                                    | Cold weather operation   | 412, 413   |
| Time scale  | 189                                    | Cranking speed relation to   | 393  |
| Stratification                                      | 511, 512                               | Engine design effects  | 412  |
| Temperature data                                    | 372                                    | Engine size effects  | 412  |
| Testing photographic methods                        | 185                                    | Factors affecting  | 412, 413   |
| Turbulence  | 511, 512                               | Maintenance data   | 415  |
| Diesel engine compared with                         | 485, 486, 487, 495                     | Oil viscosity effects  | 393  |
| Friction, oil viscosity effects                     | 393, 394                               | Torque requirements  | 412, 413, 415  |
| Fuel consumption                                    |  | Testing, combustion, photographic methods                              | 185  |
| Air-fuel mixture ratio effects                      | 511, 512                               | Wear   |  |
| Combustion deposits, effect of                      | 514                                    | Definition of  | 366  |
| Exhaust back pressure effects                       | 512                                    | Factors affecting  | 366  |
| Exhaust gas dilution effects                        | 512                                    | Oil viscosity effects  | 395, 396, 399, 400, 401                                    |
| Factors affecting                                   | 511                                    | Rate variation, causes of  | 305  |
| Ignition effects                                    |  | Reduction means  | 366, 367, 368, 369, 370                                    |
| Spark plug  |  | Surface finish importance  | 305  |
| Gap   | 512, 513                               | (See also Carburetors and Carburetion; Crankshafts; Cylinders; Detona- |  |
| Size  | 512                                    | tion; Engine Design and Construction; Engines, Aircraft;               |  |
| Timing  | 514, 528                               | Engines, Diesel; Engines, Marine; Engines, Motorcoach;                 |  |
| Induction effects                                   | 512                                    | Engines, Motor-Truck; Foreign Design and Operation;                    |  |
| Oil viscosity effects                               | 393, 394                               | Fuels; Gasoline; Generators; Ignition; Induction; Oil Filters;         |  |
| Valve timing effects                                | 512                                    | Pistons; Supercharging; and Valves and Valve Gear)                     |  |
| Heat transfer                                       |  |  |  |
| Coefficients, heat-transfer, evaluated              | 379, 380                               | <b>Engineers and Engineering</b>                                       |  |
| Cycle analysis, outline of                          | 379, 380                               | Automobile engineering organization                                    |  |
| Cylinder surface to water                           |  | Control method   | 460  |
| Coefficient of heat transfer                        | 377, 378                               | Cooperation  | 456, 460, 463, 464   |
| Temperature distribution                            | 377                                    | Designing  | 456  |
| Temperature drop, overall                           | 378                                    | Duties differentiated  | 456  |
| Gases to cylinder walls                             |  | Experimental   | 458  |
| Graphical representation of                         | 372, 373, 374                          | Functions  | 456  |
| Problem analyzed                                    | 371, 372, 373, 374, 375                | Organization charts  | 458, 460   |
| Results summarized                                  |  | Production   | 456  |
| Coefficient of heat transfer                        | 375, 376, 379                          | Reports  | 459, 460, 461, 464   |
| Density   | 373, 375, 376                          | Testing  | 458  |
| Exponents of compression and expansion              | 375                                    | Ride engineer  |  |
| Heat balance  | 376, 377                               | Importance of  | 324  |
| Heat loss   | 373, 376, 377                          | Problems   | 313, 315   |
| Speed   | 372, 375                               |  |  |
| Test data, curve showing                            | 374                                    | <b>Engines, Aircraft</b>   |  |
| Piston-head temperature                             | 378                                    | CYLINDER COOLING AND DRAG OF RADIAL ENGINE INSTALLATIONS               | 515  |
| Quantitative analysis of                            | 371                                    | ENGINE INSTALLATION AND RELATED PROBLEMS IN LARGE AIRCRAFT             | 225  |
| Load, part  | 511                                    | ENGINE INSTALLATIONS   | 48   |
| Lubricants and lubrication                          |  | FLIGHT-TESTING WITH AN ENGINE TORQUE INDICATOR                         | 49   |
| Corrosion data                                      | 304                                    | THE ACCESSORY-DRIVE PROBLEM OF AIRCRAFT ENGINES                        | 205  |
| Oil acidity   | 304                                    | THE SINGLE SLEEVE AS A VALVE MECHANISM FOR THE                         |  |
| Oil consumption                                     |  | AIRCRAFT ENGINE  | 349  |
| Cylinder finish effects                             | 306                                    | TORSIONAL VIBRATION OF IN-LINE AIRCRAFT ENGINES                        | 335  |
| Oil viscosity effects                               | 394                                    | Accessory drives   |  |
| Oil contaminants                                    |  | Accessories classified   | 206  |
| Dust  | 303                                    | Gear-box   |  |
| Fuel ends   | 303                                    | Design problems  | 207  |
| Lead salts  | 302                                    | Driving methods described  |  |
| Metals  | 303                                    | Auxiliary engine   | 208, 224   |
| Oil decomposition products                          | 303                                    | Direct   | 207  |
| Soot  | 302                                    | Hydraulic  | 207  |
| Water   | 301, 302                               | Turbine, exhaust-driven  | 207  |
| Oil dilution  | 303                                    | Merits   | 206  |
| Oil drainage  |  | History  | 205  |
| Oil filter effects                                  | 302, 304                               | Location factor  | 206  |
| Reasons for   | 301                                    | Problem analyzed   | 206, 224   |
| Time factor, indefinite                             | 304                                    | Altitude effects, fuel consumption                                     | 56, 57   |
| Sludge formation, composition of                    | 301                                    | Auxiliary engines  | 208, 224, 228  |
| Viscosity   |  | Compression ratio, Diesel and gasoline engines compared                | 165  |
| Blowby affected by                                  | 394, 395                               | Control system   | 227  |
| Cranking speed affected by                          | 393                                    | Cooling, air   |  |
| Flow at low temperatures                            | 393, 394                               | Air density effects  | 521  |
| Friction affected by                                | 393, 394                               | Air flow   | 519, 521   |
| Fuel consumption affected by                        | 393, 394                               | Air temperature effects  | 521  |
| Lower, effects of                                   | 393, 394, 395, 396, 399, 400, 401, 402 | Air velocity effects   | 516, 521, 523  |
| Mileage relation to                                 | 394, 395                               | Baffle pressure drop   | 516, 517, 518, 520, 521, 522, 523, 524, 525, 526, 527, 528 |
| Oil consumption affected by                         | 394                                    | Baffles  | 516, 517, 518, 519, 526                                    |
| Power affected by                                   | 393, 394                               | British and American practice compared                                 | 527, 528   |
| Running-in requirements                             | 401                                    | Cooling practice, present status summarized                            | 515, 516   |
| Starting affected by                                | 393                                    |  |  |
| Temperature effects                                 | 396, 399, 402                          |  |  |
| Wear affected by                                    | 395, 396, 399, 400, 401                |  |  |

# S.A.E. TRANSACTIONS

|  | PAGE  |                                      | PAGE  |
|--|---|--------------------------------------|---|
| <b>Engines, Aircraft (Continued)</b>             |   | <b>Engines, Aircraft (Continued)</b> |   |
| Cowling effects                                  | 516, 520, 521, 522, 526, 527                                    | Drag                                 |   |
| Drag affected by                                 | 515, 516  | Aircraft speed effects               | 516   |
| Fans   | 527, 528  | Cooling effects                      | 515, 516  |
| Fins   |   | Cowling effects                      | 520   |
| Design problems                                  | 517, 528  | Nacelle effects                      | 225; 516, 526   |
| Manufacturing problems                           | 517   | Propeller effects                    | 516   |
| Materials used in                                | 517, 518  | Exhaust haze                         | 162, 163  |
| Thickness  | 518   | Exhaust system                       |   |
| Heat transfer data                               | 517   | Collector design                     | 228   |
| Nacelle shape effects                            | 516   | Design requirements                  | 228   |
| Pressures  | 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528 | Double-outlet                        | 228   |
| Problems involved                                | 515, 523  | Feathering, propeller                | 299   |
| Temperature distribution                         | 518, 519  | Fuel consumption                     |   |
| Testing  | 518, 521  | Air-fuel mixture control effects     | 57, 58, 59  |
| Turbulence                                       | 516, 518, 519, 520, 528   | Altitude effects                     | 56, 57  |
| Vanes  | 527, 528  | Cylinder head temperature effects    | 57, 58  |
| Cowling  |   | Data on                              | 162, 165  |
| Aircraft speed affected by                       | 56  | Diesel and gasoline engines compared | 164, 168, 169   |
| Cooling affected by                              | 516, 520, 521, 522, 526, 527                                    | Engine speed effects                 | 297   |
| Data on  | 522, 524, 525, 526  | Fuel system                          |   |
| Design described                                 | 228   | Controls                             | 227   |
| Drag affected by                                 | 520   | Design described                     | 226, 227  |
| Exit-slot design                                 | 516, 520, 521, 522, 523, 524, 525, 526, 528                     | Operation                            | 226, 227  |
| "Eyelid," segmental                              | 526, 527  | Fuel transfer system                 |   |
| Flap setting effects                             | 56  | Description                          | 226, 227  |
| Power affected by                                | 54, 55, 56  | Merits                               | 227   |
| Reverse-flow                                     | 523, 524, 525, 528  | Induction system                     | 228   |
| Cylinder types                                   |   | Installation problems                | 48; 225, 228  |
| In-line  |   | Lubricants and lubrication           |   |
| Cooling  | 528   | Oil coolers                          | 226   |
| Cowling  | 528   | Oil temperature                      | 61; 226   |
| Merits   | 335   | Makes                                |   |
| Radial compared with                             | 528   | Allison                              | 336, 339, 341   |
| Vibration  | 335   | Bristol                              | 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361; 527, 528 |
| Radial   |   | Continental                          | 442   |
| Cooling  | 515, 528  | Franklin                             | 442   |
| Cowling  | 516, 528  | Pratt and Whitney                    | 49; 225   |
| In-line compared with                            | 528   | Wright                               | 518, 522, 523, 526, 527   |
| Diesel   |   | Mounting, design details             | 225   |
| THE DIESEL AS A HIGH-OUTPUT ENGINE FOR AIRCRAFT  | 161   | Nacelles                             |   |
| Aftercoolers                                     | 164, 168  | Drag affected by                     | 225; 516, 526   |
| Altitude effects, power                          | 165, 168  | Inboard                              | 225   |
| Bibliography available                           | 161   | Location                             | 225   |
| Boosted engine performance curves                | 163   | Outboard                             | 225   |
| Combustion, data on                              | 166   | Shape                                | 516, 526  |
| Compression ratio, gasoline engine compared with | 165   | Power*                               |   |
| Cost factor, operating                           | 168   | Air-fuel mixture control effects     | 57  |
| Cycle types                                      |   | Altitude effects                     | 51, 54, 55  |
| Four-stroke                                      |   | Atmospheric conditions affecting     | 51  |
| Data on  | 161, 162, 163, 164, 165, 166                                    | Carburetor-air temperature effects   | 51, 52, 53, 54, 55, 60, 62                                      |
| Testing  | 161, 162, 163, 164, 165, 166                                    | Cooling effects                      | 51, 54, 55, 56  |
| Two-stroke compared with                         | 166, 167, 168   | Correction methods                   | 52, 53, 54, 62  |
| Two-stroke                                       |   | Diesel and gasoline engines compared | 165, 168  |
| Data on  | 166, 167, 169   | Factors affecting                    | 51  |
| Four-stroke compared with                        | 166, 167, 168   | Flight measurement of                | 49, 50  |
| Merits   | 166, 168, 169   | Formula                              | 50  |
| Testing  | 166, 167  | Humidity effects                     | 51, 52  |
| Exhaust haze                                     | 162, 163  | Intake manifold pressure effects     | 52, 53, 54  |
| Friction, data on                                | 162, 164, 167   | Measurement by torque-indicator      | 49, 50  |
| Fuel consumption                                 |   | Performance, measured and predicted  | 52, 62  |
| Data on  | 162, 165  | Propeller effects                    | 289, 298  |
| Gasoline engine compared with                    | 161, 164, 168   | Test data                            | 59, 60  |
| Future predicted                                 | 161, 168, 169   | Torque-indicator used to measure     | 49, 50  |
| Gasoline engine compared with                    | 161, 164, 165, 168  | Trends                               | 289; 516  |
| History  | 161   | Propeller feathering                 | 299   |
| Makes, Junkers                                   | 161   | Rating, change recommended           | 298   |
| Merits   | 161, 164, 168   | Reduction gearing                    |   |
| Power  |   | Engine torque measured by            | 49  |
| Altitude effects                                 | 165   | Single-speed                         | 298   |
| Gasoline engine compared with                    | 165, 168  | Two-speed                            | 297, 298; 426   |
| Two and four-stroke cycles compared              | 167, 168  | Type, Pratt and Whitney              | 49  |
| Pressures  |   | Refueling system                     | 227   |
| Cylinder   | 164, 165, 166, 168  | Selection, factors affecting         | 298   |
| Trends   | 166, 168  | Size                                 |   |
| Safety factor                                    | 168   | Future predicted                     | 292   |
| Simplicity, gasoline engine compared with        | 168   | Propeller relation to                | 289, 290, 291, 300  |
| Temperature, inlet air                           | 164, 165  | Trends                               | 285, 289  |
| Tests, conclusions from                          | 168   | Sleeve valve, single                 |   |
| Trends   | 161, 168  | Engine development                   |   |
| Weight   |   | Description                          | 357, 358  |
| Gasoline engine compared with                    | 161, 169  | Progress                             | 355, 356, 357, 358, 362   |
| Turbo-blower effects                             | 165   | Testing                              | 356, 357, 358   |

# SUBJECT INDEX

|   | PAGE   |  | PAGE                    |
|---|--|--|-------------------------|
| <b>Engines, Aircraft (Concluded)</b>  |  | <b>Engines, Diesel (Concluded)</b>   |                         |
| Fuel injection  | 358, 362, 363, 365                               | Hercules   | 451, 452                |
| Future predicted  | 361  | Junkers  | 495                     |
| History   | 349  | Winton   | 31, 32                  |
| In-line air-cooled type   | 363  | Performance, improvement means analyzed  | 215                     |
| Maintenance   | 358, 362   | Power, supercharging effects   | 221                     |
| Merits  |  | Progress   | 451, 496                |
| Challenged  | 362  | Speed, gasoline engine compared with   | 486, 495                |
| Claimed   | 351, 358, 359, 365                               | Starters   | 414                     |
| Progress  | 355, 356, 357, 358, 359                          | <b>Supercharging</b>   |                         |
| Research, single cylinder   |  | Effects  | 215                     |
| Brake horsepower  | 351  | Problems involved  | 486                     |
| Brake mean effective pressure   | 351  | Testing combustion   | 272                     |
| Breathing efficiency  | 353, 354, 355                                    | Two-cycle  |                         |
| Cylinder data   | 353, 355, 357                                    | Advantages   | 486, 487, 495, 496      |
| Extent of   | 355  | Cooling  | 489                     |
| Fuel consumption  | 351  | Design described   | 493, 494                |
| Material as factor  | 351  | Efficiency, mechanical   | 488, 496                |
| Poppet compared with  | 353, 355, 357, 358, 359, 361, 362, 363, 364, 365 | Engine balance   | 490, 491                |
| Power curves  | 353, 357   | Field for  | 492                     |
| Tests   | 351, 353, 355                                    | Four-cycle compared with   | 487, 488, 490, 495, 496 |
| Speed   |  | Gasoline engine compared with  | 487, 495                |
| Fuel consumption relation to  | 297  | Injection system   | 489, 490, 494           |
| Trends  | 293  | Piston materials   | 489, 495                |
| Supercharging effects   | 26   | Power  | 487, 488, 494, 495, 496 |
| Testing   |  | Problems involved  | 486, 487, 491, 492      |
| Cooling   | 518, 521   | Scavenging   | 487, 488, 489, 494      |
| Cowling   | 520, 522   | Specifications   | 492                     |
| Torque indicator used   | 49, 50, 62                                       | Weight data  | 494, 495, 496           |
| Torque  |  | Vibration, blower-drive location effects   | 217, 218                |
| Indicator described   | 49, 50   | Weight, gasoline engine compared with  | 485, 486, 495           |
| Measurement of  | 49, 50   | (See also Cylinders; Detonation; Engines, Aircraft; Engines, Motor-coach; Engines, Motor-Truck; Fuels; Pistons; and Supercharging) |                         |
| Vibration   |  |  |                         |
| Amplitude calculation   | 337, 341   | <b>Engines, Marine</b>   |                         |
| Dampers   | 339, 340   | Racing   | 26                      |
| Frequencies   | 336, 337, 338                                    | Supercharging effects  | 26                      |
| Harmonic torque input   | 337  |  |                         |
| Propeller vibration affected by   | 293  | <b>Engines, Motorcoach</b>   |                         |
| Rigidity factor   | 338  | Diesel, progress   | 452                     |
| Single-node   | 335, 336, 338, 341                               | Location   | 452                     |
| Torsionmeter data   | 340, 341   | Maintenance  | 87, 88                  |
| Torsional   | 335  | Makes  |                         |
| Two-node  | 335, 336, 338, 341                               | Hall-Scott   | 452                     |
| Wear, valves and valve gear, reduction progress   | 366  | Hercules   | 452                     |
| Weight trends   | 289, 291, 292                                    | Mounting, rear   | 452                     |
| (See also Carburetors and Carburetion; Crankshafts; Cylinders; Detonation; Fuels; Gasoline; Ignition; Induction; Pistons; Supercharging; and Valves and Valve Gear) |  | Progress   | 452                     |
|   |  | Wear   | 87, 88                  |
| <b>Engines, Diesel</b>  |  |  |                         |
| AUTOMOTIVE TWO-CYCLE DIESEL ENGINES   | 485  | <b>Engines, Motor-Truck</b>  |                         |
| DIESEL DEPOSITS AS INFLUENCED BY FUELS AND OPERATING CONDITIONS   | 272  | TREND IN TRUCK-ENGINE DESIGN   | 62                      |
| DIESEL SUPERCHARGING—ITS EFFECT ON DESIGN AND PERFORMANCE   | 215  | Design trends  | 62                      |
| FUELS FOR HIGH-SPEED DIESEL ENGINES   | 42   | Diesel   |                         |
| Automotive type, data on  | 485, 486   | Cooling  |                         |
| Bearing-load diagrams   | 219, 220, 221, 222                               | Maintenance problems   | 160                     |
| Combustion  |  | Radiator servicing   | 160                     |
| Fuel deposits   |  | Design trends  | 62                      |
| Altitude effects  | 275, 276, 280                                    | European use of  | 62                      |
| Data on   | 273, 276   | Fuel distributor described   | 62                      |
| Engine temperature effects  | 273, 280   | Fuel feeding, pump setting   | 157                     |
| Engine type relation to   | 277, 278, 279, 280                               | Future predicted   | 62                      |
| Fuel type effects   | 276, 277, 280                                    | Gasoline engine compared with  | 157, 168                |
| Load effects  | 273, 280   | Maintenance  |                         |
| Lubricating oil effects   | 273  | Cold weather effects   | 157, 158, 160           |
| Mixture effects   | 275  | Design effects   | 157                     |
| Time factor   | 275, 279   | Electrical system  | 158                     |
| Testing   |  | Factors affecting  | 157                     |
| Data  | 276  | Overhaul, time required for  | 158                     |
| Engines used  | 273, 274, 277, 278, 280                          | Troubles encountered   | 158, 159, 160           |
| Methods used  | 272  | Makes, Cummins   | 157, 158, 169           |
| Progress  | 272  | Operating experience   | 157, 169                |
| Development problems  | 486  | Progress   | 62, 451                 |
| Development, reason for   | 42   | Usage extent   | 157, 169                |
| Four-cycle, two-cycle compared with   | 487, 488, 490, 495, 496                          | Future predicted   | 62                      |
| Fuel research   | 27, 36   | Lubricants and lubrication   |                         |
| Gasoline engine compared with   | 157, 168; 485, 486, 487, 495                     | Corrosion data   | 304                     |
| Maintenance problems  | 158, 159, 160                                    | Oil acidity  | 304                     |
| Makes   |  | Oil consumption  | 130                     |
| Cummins   | 62; 157, 158, 159                                | Oil contaminants   |                         |
| Fairbanks-Morse   | 31, 32   | Dust   | 303                     |
| General Motors  | 485  | Fuel ends  | 303                     |



## S.A.E. TRANSACTIONS

|  | PAGE               |  | PAGE                            |
|--|--------------------|--|---------------------------------|
| <b>Engines, Motor-Truck (Concluded)</b>        |                    | <b>Fleet Operation (Concluded)</b>   |                                 |
| Lead salts                                     | 302                | Reasons for  | 301                             |
| Metals   | 303                | Time factor, indefinite  | 304                             |
| Oil decomposition products                     | 303                | Maintenance  |                                 |
| Soot   | 302                | Electrical equipment effects   | 403, 415                        |
| Water  | 301, 302           | Inspection procedure   | 87, 88                          |
| Oil dilution                                   | 303                | Preventive   | 87, 88; 281, 282, 284           |
| Oil drainage                                   |                    | Salvage practices  | 88                              |
| Oil filter effects                             | 302, 304           | Scattered fleet  |                                 |
| Reasons for                                    | 301                | Cost factor  | 281, 284                        |
| Time factor, indefinite                        | 304                | Definition   | 281                             |
| Sludge formation, composition of               | 301                | Improvement needed   | 284                             |
| <b>Makes</b>                                   |                    | Inspector, traveling   | 281, 284                        |
| Dodge  | 451                | Preventive   | 281, 282, 284                   |
| Franklin                                       | 62; 442            | Problems   | 28                              |
| Hercules                                       | 451                | Progress   | 284                             |
| Hesselman                                      | 451                | Tools, need for special  | 88                              |
| Mack-Lanova                                    | 451                | Troubles encountered   | 158, 159, 160                   |
| Mack Thermodyne                                | 451                | <b>Tires</b>   |                                 |
| Waukesha                                       | 451                | Data on  | 101                             |
| White  | 442                | Load inflation tables  | 109, 116, 117                   |
| Power, truck performance affected by           | 344                | Selection  |                                 |
| Progress                                       | 451                | Cost affected by   | 117                             |
|  |                    | Factors affecting  | 108, 117                        |
|  |                    | Importance of  | 108, 117                        |
|  |                    | Vehicles classified by operations  | 105, 106, 107, 108, 117         |
|  |                    | Vehicle selection  |                                 |
|  |                    | Factors affecting  | 78, 79, 85                      |
|  |                    | Pitfalls to be avoided   | 78                              |
|  |                    | Railroad practice compared with  | 86                              |
|  |                    | State regulation effects   | 78, 80                          |
|  |                    | Types of vehicle   |                                 |
|  |                    | Four-wheel truck   | 80, 81                          |
|  |                    | Six-wheel truck  | 80, 81, 82                      |
|  |                    | Tractor semi-trailer   | 80, 82, 83, 84                  |
|  |                    | (See also Motorcoach Operation and Performance; and Motor-Truck Operation and Performance) |                                 |
| <b>Engines, Racing</b>                         |                    | <b>Foreign Design and Operation</b>  |                                 |
| Automobile                                     | 26                 | MOTOR-CAR ENGINES IN ENGLAND   | 229                             |
| Marine   | 26                 | Engines, aircraft, domestic compared with  | 528                             |
| Supercharging                                  | 26                 | Engines  |                                 |
|  |                    | Carburetion  | 234                             |
|  |                    | Cost factor  | 229                             |
|  |                    | Motor-truck, Diesel  | 62                              |
|  |                    | Oil types used   | 229                             |
|  |                    | Size factor  | 229                             |
|  |                    | United States compared with  | 229                             |
|  |                    | Wear, cylinder bore  | 229                             |
|  |                    | <b>Frames</b>  |                                 |
|  |                    | Progress   | 448                             |
|  |                    | Weight reduction   | 448                             |
|  |                    | <b>Fuels</b>   |                                 |
|  |                    | Aviation   |                                 |
|  |                    | Detonation testing   | 497                             |
|  |                    | Octane types, high   | 497                             |
|  |                    | Diesel   |                                 |
|  |                    | Ignition quality, test method, proposed  | 453, 454, 464                   |
|  |                    | Physical properties  |                                 |
|  |                    | Specifications   | 35                              |
|  |                    | Viscosity, ratings affected by   | 28, 29                          |
|  |                    | Rating   |                                 |
|  |                    | Balanced pressure diaphragm used   | 28, 29, 30                      |
|  |                    | Boiling-point-gravity number   | 35                              |
|  |                    | Bouncing pin used  | 28, 29, 30, 33                  |
|  |                    | Cetane number  | 28, 29, 32, 33, 34, 35, 36; 453 |
|  |                    | Cetene number  | 31                              |
|  |                    | Characterization factor  | 35                              |
|  |                    | Critical compression ratio method  | 28, 29, 30, 34                  |
|  |                    | Diesel index number  | 35                              |
|  |                    | Direct matching method   | 27, 32                          |
|  |                    | Engine, Cooperative Fuel Research, used  | 32                              |
|  |                    | Ignition lag method  | 28, 32                          |
|  |                    | Ignition quality   | 27, 32, 35, 36                  |
|  |                    | Ignition quality factor, calculated  | 35, 36                          |
|  |                    | Injection timing effects   | 29                              |
|  |                    | Institute of Petroleum Technologists method  | 32                              |
|  |                    | Knockmeter used  | 33                              |
|  |                    | Laboratory and full-scale correlation  | 31, 32                          |
|  |                    | Modified magnetic pickup method  | 30, 31                          |
|  |                    | Pennsylvania State College method  | 31                              |
| <b>Finishes</b>                                |                    |  |                                 |
| SYNTHETIC-RESIN ENAMEL FINISHES                | 131                |  |                                 |
| Colors   |                    |  |                                 |
| Durability variation                           | 132                |  |                                 |
| Matching of                                    | 136                |  |                                 |
| Temperature variation effects                  | 135                |  |                                 |
| Dip-finishing                                  |                    |  |                                 |
| Color-matching                                 | 136                |  |                                 |
| Sheet-metal parts                              | 136                |  |                                 |
| Enamels, soya-bean                             | 131                |  |                                 |
| History  | 131                |  |                                 |
| Lacquers, synthetic-resin enamel compared with | 131                |  |                                 |
| Progress                                       | 131, 132           |  |                                 |
| Soya-bean enamels                              | 131                |  |                                 |
| Synthetic-resin enamel                         |                    |  |                                 |
| Application                                    |                    |  |                                 |
| Baking   |                    |  |                                 |
| Drying oven described                          | 136                |  |                                 |
| Lights used for                                | 136                |  |                                 |
| Temperatures                                   | 134, 135           |  |                                 |
| Dip-finishing                                  | 136                |  |                                 |
| Precautions                                    | 132, 133           |  |                                 |
| Preparation for                                | 132, 133, 134      |  |                                 |
| Procedure                                      | 132, 133, 134, 135 |  |                                 |
| Bakelite, composition of                       | 131                |  |                                 |
| Colors   | 132                |  |                                 |
| Composition of                                 | 131                |  |                                 |
| Durability                                     | 131, 132           |  |                                 |
| Exposure tests                                 | 131, 132           |  |                                 |
| Future predicted                               | 136                |  |                                 |
| Gilsonite                                      | 136                |  |                                 |
| Lacquers compared with                         | 131                |  |                                 |
| Merits   | 132                |  |                                 |
| Oils used in                                   | 131                |  |                                 |
| Progress                                       | 132                |  |                                 |
| Repairing                                      | 136                |  |                                 |
| Resin, choice of                               | 131                |  |                                 |
| Tests, exposure                                | 131, 132           |  |                                 |
| Time element                                   | 131                |  |                                 |
| <b>Fleet Operation</b>                         |                    |  |                                 |



# SUBJECT INDEX

|   | PAGE                    |   | PAGE               |
|---|-------------------------|---|--------------------|
| <b>Fuels (Concluded)</b>                          |                         | <b>Generators (Concluded)</b>                           |                    |
| Reference fuels                                   | 28, 29, 30, 32, 34      | Electrical load requirements                            |                    |
| Reproducibility                                   | 28, 29, 32              | Increased, reasons for                                  | 403                |
| Socony-Vacuum delay method                        | 30                      | Running time relation to                                | 403                |
| Viscosity effects                                 | 28, 29                  | Size affected by  | 403                |
| Viscosity-gravity number                          | 35                      | Location  | 404                |
| Octane number, data on                            | 68                      | Maintenance   |                    |
| Olefinic  | 497                     | Data  | 406, 407, 415      |
| Testing   |                         | Factors affecting                                       | 403, 404, 405      |
| Aviation fuel                                     | 497                     | Motorcoach  | 403, 405, 406      |
| Detonation  | 497                     | Motor-truck   | 404, 405, 406      |
| Diesel  | 27, 36                  | Mounting  | 444                |
| (See also Detonation, Fuel Factors; and Gasoline) |                         | Progress  | 444                |
|   |                         | Radio requirements                                      | 404                |
|   |                         | Selection, factors involved                             | 403, 404, 405, 406 |
|   |                         | Size, factors affecting                                 | 403, 404           |
|   |                         | Types required  | 404, 405, 406      |
|   |                         | Voltage regulation                                      | 406, 407           |
|   |                         | Wiring and connections                                  | 407, 408           |
|   |                         |   |                    |
| <b>G</b>  |                         | <b>H</b>  |                    |
| <b>Gasoline</b>                                   |                         | <b>Headlighting</b>                                     |                    |
| Aviation  |                         | Headlamps, location of                                  | 449                |
| Detonation testing                                | 497                     | Progress  | 449                |
| Octane types, high                                | 497                     |   |                    |
| Octane number, data on                            | 68                      | <b>Highways</b>   |                    |
| Testing   |                         | (See Roads and Streets)                                 |                    |
| Aviation fuel                                     | 497                     |   |                    |
| Detonation  | 497                     |   |                    |
| (See also Detonation, Fuel Factors; and Fuels)    |                         |   |                    |
|   |                         | <b>I</b>  |                    |
| <b>Gears</b>                                      |                         | <b>Ignition</b>   |                    |
| Deflection  |                         | Aircraft, trouble checking with engine torque indicator | 61                 |
| Effects of  | 509, 510                | Application chart                                       | 411                |
| Tests   |                         | Coil  |                    |
| Data evaluated                                    | 510                     | Failure causes  | 411                |
| Description of                                    | 504                     | Mounting  | 411                |
| Importance of                                     | 509                     | Testers, types of                                       | 411                |
| Fatigue life                                      | 504, 509                | Types of  | 409, 410           |
| Hypoid  | 325, 328, 329; 446; 509 | Condenser failures                                      | 412                |
| Lubrication                                       |                         | Dirt effects  | 410                |
| Extreme-pressure usage                            | 365                     | Distributor   |                    |
| Testing   | 325, 328                | Cap   | 409, 411           |
| Production  |                         | Condenser   | 409, 412           |
| Climb hobbing                                     |                         | Maintenance data  | 412                |
| Definition  | 1                       | Mounting  | 409                |
| Test results                                      | 2                       | Rotor   | 409                |
| Cutting methods, improvement needed               | 2                       | Engine ignition requirements                            | 408                |
| Finishing methods                                 |                         | Engine vibration effects                                | 409, 410, 415      |
| Burnishing  | 2, 3                    | Faults, causes and remedies                             | 514                |
| Shaving   |                         | Maintenance data  | 410, 411, 412, 415 |
| Circular cutting method                           | 2, 3                    | Moisture effects  | 410, 415           |
| Control effects                                   | 2, 3                    | Progress  | 444                |
| Rack method                                       | 2, 3                    | Spark plugs   |                    |
| Grinding, three types described                   | 3                       | Fuel consumption affected by                            | 512, 513           |
| Rear axle   |                         | Gap   | 512, 513           |
| Deflection tests                                  |                         | Life, factors limiting                                  | 514                |
| Data  | 506, 510                | Size  | 512                |
| Importance of                                     | 509                     | Testing   | 465                |
| Machine described                                 | 504                     | Temperature effects                                     | 410, 415           |
| Procedure   | 504, 505                | Testing, spark plugs                                    | 465                |
| Durability  |                         | Timing  |                    |
| Factors affecting                                 | 504, 509                | Control, vacuum   |                    |
| Hypoid, merits                                    | 509                     | Fuel consumption affected by                            | 444                |
| Testing   |                         | Progress  | 444                |
| Deflection  | 504                     | Fuel consumption affected by                            | 444; 514, 528      |
| Gleason "four-square" test                        | 326, 329                | Voltage   | 514                |
| Lubrication                                       | 325, 328                | Wiring, high-tension                                    | 411                |
| Wear  | 326, 328                |   |                    |
| Transmission                                      |                         | <b>Indicators, Engine</b>                               |                    |
| Deflection tests                                  |                         | FLIGHT-TESTING WITH AN ENGINE TORQUE INDICATOR          | 49                 |
| Data  | 506                     | Aircraft engine use of                                  | 49, 62             |
| Machine described                                 | 504                     | Balanced diaphragm                                      | 187                |
| Procedure   | 504, 505                | Carbon stack  | 187                |
| Durability  | 504, 509                | Makes, Pratt and Whitney                                | 49, 50, 61         |
| Wear, testing                                     | 326, 328                | Sampling valve  | 188                |
|   |                         | Torque indicator  |                    |
|   |                         | Description of  | 49, 50             |
|   |                         | Field for   | 62                 |
|   |                         | <b>Induction</b>  |                    |
|   |                         | Aircraft, design requirements                           | 228                |
|   |                         | Distribution, data on                                   | 142                |
|   |                         |   |                    |
| <b>Generators</b>                                 |                         |   |                    |
| Application                                       |                         |   |                    |
| Chart   | 406                     |   |                    |
| Types of  | 404, 405, 406           |   |                    |
| Belt life increase                                | 444                     |   |                    |
| Capacity requirements                             | 403, 404, 405           |   |                    |
| Connections and wiring                            | 407, 408                |   |                    |
| Drive ratios                                      | 405, 415                |   |                    |

## S.A.E. TRANSACTIONS

[illegible]

# SUBJECT INDEX

|   | PAGE                    |  | PAGE                              |
|---|-------------------------|--|-----------------------------------|
| <b>Motor-Truck Design and Construction (Concluded)</b>  |                         | <b>Motor-Truck Operation and Performance (Continued)</b> |                                   |
| Camel-back type, merits   | 3                       | Inspection   | 128, 129; 160, 169                |
| Driver comfort, camel-back vs. conventional   | 3                       | Lubrication  |                                   |
| Electrical equipment  | 403, 415                | Importance of  | 128, 130                          |
| Engine location   |                         | Oil drainage   |                                   |
| Changes in  | 119                     | Oil filter effects                                       | 302, 304                          |
| Factors affecting   | 119                     | Reasons for  | 301                               |
| Load distribution affected by   | 119                     | Time factor, indefinite                                  | 304                               |
| Tires affected by   | 119                     | Manufacturer and operator cooperation needed             | 126                               |
| Types of  | 119                     | Preventive   | 127; 160, 169; 281, 282, 284      |
| Vehicle length affected by  | 119, 120, 121           | Problems   | 157, 158                          |
| Wheelbase affected by   | 119, 120                | Records  |                                   |
| Engine-under-seat type  |                         | Data obtained from                                       | 127                               |
| Accessibility factor  | 130                     | Examples of  | 123, 124, 125, 126, 127, 128, 129 |
| Appearance  | 130                     | Importance of  | 123, 126                          |
| Braking   | 130                     | Vehicle selection influenced by                          | 123                               |
| Conventional type compared with   | 119, 120, 121, 122, 130 | Safety affected by                                       | 160                               |
| Cost factor   | 119                     | Scattered fleet problems                                 | 281                               |
| Criticisms of   | 119                     | Schedules  | 127; 157                          |
| Definition of   | 119                     | Troubles encountered                                     | 158, 159, 160                     |
| Description of  | 3                       | Operator interest in                                     | 343, 344                          |
| Driver reaction to  | 122, 130                | Overloading  | 81; 343                           |
| Field for   | 119                     | Performance  |                                   |
| History   | 119                     | Capacity relation to                                     | 342                               |
| Length reduction  | 120, 121, 122           | Definition   | 342                               |
| Maintenance, accessibility  | 130                     | Measurement of   | 344                               |
| Merits  | 3; 119, 120, 121, 122   | Power relation to  | 344                               |
| Payload   | 121                     | Rating   |                                   |
| Springs affected by   | 122                     | Factors involved   | 344, 345                          |
| Steering  | 130                     | Formula  |                                   |
| Turning-circle  | 120, 121                | Need for   | 343, 348                          |
| Visibility  | 130                     | Requirements listed                                      | 348                               |
| Weight distribution   | 122                     | Rear-wheel horsepower                                    |                                   |
| Wheelbase reduction   | 120, 130                | Computation based on                                     | 345                               |
| Frame stresses, camel-back vs. conventional   | 3                       | Factors of   | 344                               |
| Legislative effects   | 381, 382                | Importance of  | 348                               |
| Length, camel-back vs. conventional   | 3                       | Regulation trends  | 343                               |
| Maintenance, engine-under-seat type   | 130                     | Safety factor  | 343, 344; 383, 384                |
| Makes   |                         | Semi-trailers  |                                   |
| Chevrolet   | 451, 452                | Cost factor  | 84                                |
| Dodge   | 452                     | Disadvantages  | 84                                |
| Ford  | 451                     | Field for  | 83, 84                            |
| Mack  | 452                     | "Jack-knifing," data on                                  | 84, 86                            |
| Progress  | 37, 39; 451, 452        | Merits   | 83, 84, 86                        |
| Weight distribution, camel-back vs. conventional  | 3                       | Rigid type compared with                                 | 80                                |
| Wheelbase, camel-back vs. conventional  | 3                       | Six-wheel trucks compared with                           | 80, 86                            |
| (See also Axles; Bodies; Brakes; Engines, Motor-Truck; Legislation; Motor-Truck Operation and Performance; Six-Wheel Vehicles; Springs, Suspension; Tires; Trailers; and Transmissions) |                         | State regulation effects                                 | 80, 82, 83, 84, 85, 86            |
|   |                         | Usage extent   | 86                                |
|   |                         | Six-wheel vehicles                                       |                                   |
|   |                         | Field for  | 82                                |
|   |                         | Merits   | 82, 86                            |
|   |                         | Semi-trailers compared with                              | 80, 86                            |
|   |                         | State regulation effects                                 | 80, 82, 83, 84, 86                |
|   |                         | Types of   | 81, 82                            |
|   |                         | Speed factor   | 210, 211; 342, 343                |
|   |                         | Strength, chassis, relation to                           | 342                               |
|   |                         | Tractive ability   | 342                               |
|   |                         | Transmissions  | 79; 346, 347                      |
|   |                         | Tires, data on   | 101                               |
|   |                         | Vehicle selection  |                                   |
|   |                         | THE ECONOMICS OF TRUCK SELECTION                         | 37                                |
|   |                         | Ability factor   | 40; 78, 79, 80, 86                |
|   |                         | Appearance   | 42                                |
|   |                         | Axle limits  | 82, 83, 84                        |
|   |                         | Bulk purchases, economy of                               | 42                                |
|   |                         | Charts, weight and axle limits                           | 82, 83, 84                        |
|   |                         | Chassis available  | 37                                |
|   |                         | Chassis specifications factor                            | 40                                |
|   |                         | Cost factors   |                                   |
|   |                         | First cost   | 37, 38, 42                        |
|   |                         | Operating cost   | 39, 42                            |
|   |                         | Weight relation to                                       | 38                                |
|   |                         | Engine factors   |                                   |
|   |                         | Displacement   | 78, 79                            |
|   |                         | Fuel consumption   | 80                                |
|   |                         | Power  | 78, 80, 86                        |
|   |                         | Torque   | 78, 80, 86                        |
|   |                         | Experimentation vs. standardization                      | 41                                |
|   |                         | Factors affecting  | 78, 79, 85; 123, 124; 348         |
|   |                         | Legal factor   | 42                                |
|   |                         | Manufacturer reliability                                 | 40                                |
|   |                         | Pitfalls to be avoided                                   | 78                                |
|   |                         | Records used to help in                                  | 123                               |
|   |                         | Replacement considerations                               | 41, 42                            |
|   |                         | Safety factor  | 42                                |
| <b>Motor-Truck Operation and Performance</b>  |                         |  |                                   |
| EFFECT OF APPLICATION ON MAINTENANCE OF AUTOMOTIVE ELECTRICAL EQUIPMENT   | 403                     |  |                                   |
| MAINTENANCE OF A CONCENTRATED FLEET OF LARGE TRUCKS   | 123                     |  |                                   |
| MARCH OF PROGRESS IN THE DEVELOPMENT OF TRANSPORTATION  | 381                     |  |                                   |
| THE OUTLOOK ON LEGAL PERFORMANCE REQUIREMENTS   | 209                     |  |                                   |
| TRUCK MAINTENANCE PROBLEMS  | 157                     |  |                                   |
| TRUCK PERFORMANCE   | 342                     |  |                                   |
| Acceleration  | 342                     |  |                                   |
| Chauffeur rotation  | 84, 85                  |  |                                   |
| Cost  |                         |  |                                   |
| Factors affecting   | 344                     |  |                                   |
| Operating, analysis of  | 85                      |  |                                   |
| Size relation to  | 84                      |  |                                   |
| Depreciation  | 128                     |  |                                   |
| Design effects  | 346                     |  |                                   |
| Drawbar pull  | 342                     |  |                                   |
| Electrical equipment, maintenance affected by   | 403, 415                |  |                                   |
| Gears, function of  | 345                     |  |                                   |
| Gearshifting relation to  | 346, 348                |  |                                   |
| Grade-climbing ability  | 209, 210, 211; 342, 343 |  |                                   |
| Legislative effects   | 382, 383, 384           |  |                                   |
| Legislative interest in   | 342, 343                |  |                                   |
| Lubrication problems  | 128, 130; 301, 302, 304 |  |                                   |
| Maintenance   |                         |  |                                   |
| Cold weather effects  | 157, 158                |  |                                   |
| Cost factor   | 281, 284                |  |                                   |
| Design effects  | 126                     |  |                                   |
| Driver responsibility   | 126                     |  |                                   |
| Electrical equipment effects  | 403, 415                |  |                                   |
| Failure causes  | 126                     |  |                                   |

## S.A.E. TRANSACTIONS

[illegible]



# SUBJECT INDEX

|  | PAGE                         |   | PAGE                                   |
|--|------------------------------|---|--|
| <b>Production (Concluded)</b>  |                              | <b>Research (Concluded)</b>                               |  |
| Dressing, wheel diameter effects   | 92, 93                       | Methods   |  |
| Factors affecting  | 89, 90                       | Analysis of   | 173, 174, 175, 176, 177, 178, 179, 180 |
| Fundamentals of  | 89                           | Classification of   | 170                                    |
| Gear   | 3                            | Quantities involved in                                    | 172                                    |
| Geometrical factors  | 90                           | Stiffness relation to                                     | 173, 174, 175                          |
| Heating  |                              | Technique   |  |
| Effects  | 91, 95, 96                   | Improvements made   | 180                                    |
| Sources of   | 91                           | Improvements needed                                       | 184                                    |
| Mathematical analyses  | 90, 91, 92, 97, 98, 99, 100  | Weight relation to  | 173, 174, 183                          |
| Metals ground  |                              | Resilient mounting effects                                | 175, 176                               |
| Heating effects  | 91                           | Resistance, radiation                                     | 176                                    |
| Properties of  | 89, 90                       | Resonance   | 179                                    |
| Plunge-cut   | 90, 98, 99                   | Sabines defined   | 183                                    |
| Scratches  | 92, 93, 96                   | Sound absorption data                                     | 177, 178, 179, 183, 184                |
| Shoulder-surface   |                              | Vibration   | 172, 173, 174, 175, 176, 178, 179, 184 |
| Problems   | 92                           | (See also Indicators, Engine; Instruments; and Testing)   |  |
| Wheel structure effects  | 92                           |   |  |
| Surface  | 89, 90, 97                   | <b>Riding Qualities</b>                                   |  |
| Surface conformity   | 90, 91, 96                   | RIDE CONTROLS AND CALIBRATION                             | 313                                    |
| Up-cut   | 90, 91, 93, 94, 98, 99       | Balance, factors affecting                                | 314, 315                               |
| Wheels   |                              | Bearing material effects                                  | 317                                    |
| Characteristics of   | 89, 94, 95                   | Damping, high and low frequency                           | 317                                    |
| Heating effects  | 91, 95, 96                   | Factors affecting   | 313, 316                               |
| Keeness  | 92                           | "Flat-type" rides   | 313, 314                               |
| Scratches caused by  | 92                           | Frictional characteristics relation to                    | 313, 314, 316, 317                     |
| Selection of   | 97                           | Oscillation center, location of                           | 315, 318                               |
| Size effects   | 92, 93                       | Ride calibration  | 313                                    |
| Structure effects  | 91, 92                       | Ride character, factors affecting                         | 318, 324                               |
| Machine-tool types   | 100                          | Ride control  | 313, 315, 317                          |
| Manufacturing plants, Chevrolet  | 455                          | Ride development problem, importance of                   | 313                                    |
| Production engineer, automobile  |                              | Shock absorber effects                                    | 316                                    |
| Cooperation with other departments   | 456, 460, 463                | Spring, suspension, effects                               | 316                                    |
| Duties   | 456                          | Trends  | 313, 314                               |
| Splines, climb-hobbing   | 1                            |   |  |
| (See also Aircraft Design and Construction, Production; Automobile Design and Construction, Production; Bodies, Production; Corrosion and Corrosion Prevention; Cylinders; Finishes; Gears; and Tools) |                              | <b>Rims</b>   |  |
|  |                              | (See Tires and Rims)                                      |  |
|  |                              | <b>Roads and Streets</b>                                  |  |
|  |                              | Improvements suggested                                    | 214                                    |
|  |                              | Traffic   |  |
|  |                              | Research  | 343                                    |
|  |                              | Sight-distance improvement needed                         | 214                                    |
|  |                              | Speed effects   | 209, 214                               |
|  |                              | <b>Rubber</b>   |  |
|  |                              | Springs, suspension, use of                               | 447, 448                               |
|  |                              | Synthetic   | 443                                    |
|  |                              | <b>S</b>  |  |
| <b>R</b>   |                              | <b>S.A.E.</b>   |  |
| <b>Railroads</b>   |                              | Cooperative Tractor Tire Testing Committee                | 13                                     |
| (See Transportation)   |                              | Tractor and Industrial Power Equipment Activity Committee | 13                                     |
|  |                              | (See also Cooperative Fuel Research)                      |  |
| <b>Research</b>  |                              | <b>Safety</b>   |  |
| NEW TECHNIQUE FOR NOISE REDUCTION  | 170                          | (See Accidents and Accident Prevention)                   |  |
| Car development  | 457, 458, 459, 464           | <b>Shock Absorbers</b>                                    |  |
| Noise  |                              | Control functions   | 316                                    |
| Absorption, acoustical   | 179                          | Hydraulic   | 316                                    |
| Accuracy of parts, effects of  | 180                          | Mounting  | 450                                    |
| Acoustics  | 179, 183, 184                | Progress  | 313, 449, 450                          |
| Area effects   | 176                          | Ride control progress                                     | 313                                    |
| Audio-frequencies  | 176                          | "Ride controls"   | 313                                    |
| Aural comparisons, usefulness of   | 184                          | Riding qualities affected by                              | 313, 316                               |
| Body panels  | 175, 184                     | Variables, diagram of                                     | 316                                    |
| Components, number of  | 172                          | Vibration reduction                                       | 450                                    |
| Concepts   |                              | <b>Six-Wheel Vehicles</b>                                 |  |
| Ear vs. instruments  | 171                          | SEMI-TRAILERS VERSUS SIX-WHEELERS                         | 77                                     |
| Instruments vs. ear  | 171                          | Field for   | 82                                     |
| Pressure, sound  | 171, 172, 173                | Merits  | 82, 86                                 |
| Reduction, appreciable   | 170, 171, 173                | Semi-trailers compared with                               | 80, 86                                 |
| Sound cancellation   | 173                          | State regulation effects                                  | 80, 82, 83, 84, 86                     |
| Sound pressure   | 171, 172, 173                | Types of  | 81, 82                                 |
| Summary of data relating to  | 173                          |   |  |
| Velocity   | 171, 172                     | <b>Springs, Suspension</b>                                |  |
| Damping resistance, mechanical   | 179                          | Coil  | 314, 316, 447, 448                     |
| Enclosure effects  | 177, 178, 179                | Deflection rate   | 448                                    |
| Frequencies  | 176, 180                     |   |  |
| Hysteresis loss  | 179                          |   |  |
| Loudness   | 172, 173                     |   |  |
| Radiation resistance   | 176                          |   |  |
| Reduction  |                              |   |  |
| Damping materials, merits of   | 184                          |   |  |
| Examples given   |                              |   |  |
| Paper machine  | 182                          |   |  |
| Refrigerator compressor  | 181                          |   |  |
| Vacuum cleaner   | 181                          |   |  |
| Formulas   | 173, 174, 175, 177, 178, 183 |   |  |
| Instrumentation  |                              |   |  |
| Difficulties in using  | 183                          |   |  |
| Need for   | 183                          |   |  |
| Simplification needed  | 184                          |   |  |



# S.A.E. TRANSACTIONS

|   | PAGE                         |  | PAGE                    |
|---|------------------------------|--|-------------------------|
| <b>Springs, Suspension (Concluded)</b>                    |                              | <b>Testing (Concluded)</b>   |                         |
| Friction  | 313, 314, 316, 317           | Durability tests, data on  | 459                     |
| Front, independent type                                   | 313, 314                     | Experimental engineering organization  | 458, 459                |
| Leaf  | 316; 447, 448                | Laboratory   | 458, 459                |
| Progress  | 313, 316; 447, 448           | Proving ground   | 458, 459                |
| Rear, non-independent type                                | 313                          | Road tests   | 464                     |
| Riding qualities affected by                              | 313, 318                     | Test code, General Motors  | 459                     |
| Types described   | 447, 448                     | Climb-hobbing method   | 1, 2                    |
| Weight reduction  | 448                          | Engine, combustion, photographic methods   | 185                     |
| <b>Steels</b>   |                              | Engine, aircraft   |                         |
| Aircraft propeller blades                                 | 287                          | Cooling, air   | 518, 521                |
| <b>Steering Systems</b>                                   |                              | Cowling  | 520, 522                |
| Geometry, improvements due to                             | 448                          | Data   | 62                      |
| Progress  | 448, 449                     | Flight-testing   | 49, 50, 62              |
| Wheels  |                              | Instruments for  | 49, 50                  |
| Plastic   | 449                          | Engine, Diesel fuel deposits   | 272                     |
| Progress  | 449                          | Fuel   |                         |
| <b>Streets</b>  |                              | Aviation   | 497                     |
| (See Roads and Streets)                                   |                              | Diesel   | 27, 36; 453, 454, 464   |
| <b>Supercharging</b>                                      |                              | Gears  | 2; 504                  |
| DIESEL SUPERCHARGING—ITS EFFECT ON DESIGN AND PERFORMANCE | 215                          | Lubricant  |                         |
| SUPERCHARGER INSTALLATION PROBLEMS                        | 472                          | Extreme-pressure   | 325, 334                |
| THE SUPERCHARGER—ITS PROGRESS AND PROSPECTS               | 26                           | Hypoid, methods described  |                         |
| Aircraft  |                              | Film-strength machine  | 325, 326                |
| Altitude effects  | 474, 475, 476, 477, 478, 479 | Shock, laboratory  | 325, 326, 332, 333      |
| Carburetor location                                       | 472, 473                     | Shock, road  | 325, 333                |
| Diesel  |                              | Spark plug   |                         |
| Boosted engine performance curves                         | 163                          | Data   | 466, 467, 468, 470, 471 |
| Data on   | 164, 165, 166, 167, 168      | Method   |                         |
| Drive methods   |                              | Description of   | 466, 467, 470, 471      |
| Exhaust-turbine type                                      |                              | Validity of  | 467                     |
| Diagram of  | 473                          | Need for   | 465, 469, 471           |
| Exhaust system design problems                            | 480, 481                     | Preignition, resistance to   | 465                     |
| Installation problems of                                  | 473, 484                     | Test engine  |                         |
| Regulation of   | 473, 484                     | Air-cooled single-cylinder   | 469, 470                |
| Geared type   | 472, 473                     | Liquid-cooled single-cylinder  | 466, 470                |
| Types listed  | 472                          | Splines, climb-hobbing of  | 1                       |
| Example given   | 26                           | Tires  | 13, 26                  |
| Exhaust back pressure, test data on                       | 480                          | Tractors, farm   | 13, 26                  |
| Installation efficiency                                   |                              | X-rays used in   | 7, 9, 10, 46            |
| Formula   | 477, 478                     | (See also Detonation, Testing; Fuels, Diesel, Rating; Indicators, Engine; and Instruments) |                         |
| Importance of   | 472                          | <b>Tire and Rim Association</b>  | 13                      |
| Problems involved   | 472                          | <b>Tires and Rims</b>  |                         |
| Intercooling  |                              | THE TRACTION OF PNEUMATIC TRACTOR TIRES  | 13                      |
| Data  | 476, 477                     | WHAT FLEET OPERATORS SHOULD KNOW ABOUT TIRES   | 101                     |
| Installation effects                                      | 475, 476, 477, 478           | Balloon  |                         |
| Pressure drop effects                                     | 474                          | High-pressure compared with  | 102, 117                |
| Power   |                              | Merits   | 102                     |
| Factors affecting   | 474, 479                     | Cotton cord usage  | 447                     |
| Requirements  | 473, 474                     | Dual   | 113                     |
| Take-off power  | 481, 482, 483, 484           | Failures   |                         |
| Automobile, racing engine use of                          | 26                           | Causes of  | 117                     |
| Blowers   |                              | Types of   | 103, 104                |
| Drive location  | 217, 218                     | Loading  |                         |
| Roots type  | 217                          | Load-inflation tables  | 109, 116, 117           |
| Definition  | 26                           | Overloading effects  | 110                     |
| Diesel  |                              | Maintenance  | 109, 110, 112, 113      |
| Blowers   | 217                          | Mileage  | 101                     |
| Brake mean effective pressure increased by                | 223                          | Motor-truck  |                         |
| Design affected by  | 216, 223                     | Balloon vs. high-pressure  | 102                     |
| Fuel consumption affected by                              | 223                          | High-pressure, balloon compared with   | 102, 117                |
| Merits  | 223, 224                     | Maintenance problems   | 160                     |
| Power affected by   | 221                          | Pneumatic  |                         |
| Problems involved   | 486                          | Classification   | 101, 102, 103           |
| Pressures affected by                                     | 216                          | Failure causes   | 103                     |
| Smoke density   | 216, 224                     | Heat effects   | 109                     |
| Weight reduced by   | 223                          | Inflation effects  | 112                     |
| History   | 26                           | Overloading effects  | 110                     |
| Motorboat   | 26                           | Progress   | 101                     |
| Power affected by   | 26; 221; 474                 | Repairing  | 115                     |
|   |                              | Retreading   | 113                     |
|   |                              | Road effects   | 112                     |
|   |                              | Season effects   | 109                     |
|   |                              | Selection factors  | 105, 106, 107, 108      |
|   |                              | Speed effects  | 110                     |
|   |                              | Tractor  |                         |
|   |                              | Inflation pressure   | 21, 23, 26              |
|   |                              | Load vs. speed   | 25, 26                  |
|   |                              | Rolling resistance   | 24, 25, 26              |
|   |                              | Speed vs. load   | 25, 26                  |
| <b>Testing</b>  |                              |  |                         |
| HI-DUTY SPARK-PLUG TESTING                                | 465                          |  |                         |
| TESTING OF HYPOID LUBRICANTS                              | 325                          |  |                         |
| Aircraft castings   | 7, 12, 46                    |  |                         |
| Cars, new model   |                              |  |                         |
| Correlation, field and laboratory                         | 459, 460                     |  |                         |

## SUBJECT INDEX

[illegible]



# General Editorial Section

## Author Index

| AUTHOR  | TITLE OF PAPER  | PAGE         |
|---|---|--------------|
| Abbott, Dr. Ernest J.                                 | Measuring Surface Finish in Production  | No 18        |
| Abbott, Dr. Ernest J.                                 | New Technique for Noise Reduction   | Fe 15        |
| Ables, W. C.  | The Effect of Weather Conditions on Radio and Flight Plans                      | Fe 38        |
| Adams, Dr. C. A.                                      | The Fundamentals of Electric Welding  | Jn 15        |
| Ahrens, R. M.   | Motor Coach Maintenance Problems  | Jn 23; Je 36 |
| Aitken, Murray  | The Design and Manufacture of Leaf Springs                                      | Jl 31; No 38 |
| Alden, R. C., and D. G. Proudfoot                     | Some Improvements Relating to Seasonal Gasoline and Lubricating Oil             | Fe 53        |
| Allison, James  | Magnetic Testing of Ferrous Metals  | My 35        |
| Altman, Peter   | The Light Airplane for Private Owner  | No 38        |
| Anglada, J. A.  | Development and Trend in Truck Design   | Mr 25        |
| Anthony, C. G.  | Reducing Costs  | De 11        |
| Armer, J. C.  | Net Economic Value of the Automotive Industry to Canada                         | Mr 22; Se 25 |
| Arnold, F. G.   | Effect of Design and Construction on Maintenance and Overhaul of Naval Aircraft | Fe 56        |
| Bachman, B. B.  | Engineering Facts in Support of the Camel-Back Truck                            | Jn 35        |
| Bachman, B. B.  | Modern Conditions Demand Modern Trucks  | Jn 24; Fe 56 |
| Bachman, B. B.  | Truck Chassis Maintenance   | No 25        |
| Baker, C. F.  | Propeller Problems Imposed by Stratosphere Flight Requirements                  | Ap 26        |
| Baker, Paul S.  | Engineering Flight Testing  | My 30        |
| Baker, William S.                                     | Piston Rings  | Ap 21; No 36 |
| Barrie, Allan A.                                      | Plotted Transport Flight Plan   | Mr 21; Oc 20 |
| Bartholomew, Earl; Harold Chalk and Benjamin Brewster | Carburetion, Manifolding and Fuel Antiknock Value                               | Fe 36        |
| Barton, C. H., and E. L. Bass                         | Aircraft-Engine Lubrication   | Jl 36        |
| Bass, E. L., and C. H. Barton                         | Aircraft-Engine Lubrication   | Jl 36        |
| Bass, Dr. Lawrence W.                                 | Automotive Research   | Fe 38        |
| Bassett, John, and C. Bockius                         | Brakes - Can They Take It?  | Mr 25        |
| Baster, F. S.   | Why Not 125 BMEP in an Ell-Head Truck?  | De 10        |
| Batt, William L.                                      | Business and Government   | Ap 32        |
| Beall, A. L., and L. M. Townsend                      | Hi-Duty Spark Plug Testing  | My 33        |
| Beck, William H.                                      | Color Research  | Mr 24        |
| Becker, A. E.   | Effect of Test Conditions on Fuel Rating  | Fe 36        |
| Bennett, John   | Diesel Maintenance Problems   | Jn 30        |
| Benninghoff, W. E.                                    | The Tocco Process of Hardening and Late Developments                            | No 24        |
| Berger, A. L., and Opie Chenoweth                     | Supercharger Installation Problems  | Jl 35        |
| Berliner, Henry A.                                    | European Aircraft Production Equipment  | Fe 56        |
| Best, Robert  | Essentials of Fuel Utilization in Diesel Engines of the Automotive Type         | Fe 54        |
| Blackwood, A. J.; C. B. Kass, and G. H. B. Davis      | A Practical Approach to the Road Detonation Problem                             | Jl 39        |
| Bleicher, C. E.                                       | Car Cost Control  | My 16; No 27 |
| Blok, H.  | Four Ball Testing Apparatus   | No 21        |
| Blum, Dr. H. F.                                       | Visual Acuity   | Je 30        |
| Bockius, C., and John Bassett                         | Brakes - Can They Take It?  | Mr 25        |
| Boden, E. G.  | Deflection Tests of Axles and Transmissions                                     | My 23; No 38 |
| Boelter, Prof. L. M. K.                               | Roadway Illumination  | Je 30        |
| Boelter, L., and W. R. Sharkey                        | The Performance of Automotive Lighting Devices                                  | Jn 33        |
| Booth, R. G., and T. H. Mullen                        | Depreciation  | De 22        |
| Boyd, T. A.   | C.F.R. 1937 Road Knock Tests  | Fe 36        |
| Boyd, T. A.   | Research  | Ap 33        |
| Brady, C. A.  | Some Phases of Mechanical Laboratory Test Work                                  | Jn 31; Ag 26 |
| Brady, George   | Aerodynamic Considerations Affecting Propellers for Large Aircraft Engines      | Ap 26        |
| Braun, Wallace L.                                     | Technical Progress in Safety Promotion on City Streets                          | Jn 30; Ag 26 |

### Abbreviations Used:

January, Jn  
February, Fe  
March, Mr

April, Ap  
May, My  
June, Je

### Months of the Year

July, Jl  
August, Ag  
September, Se

October, Oc  
November, No  
December, De

(P) indicates paper published in full.



# S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

| AUTHOR   | TITLE OF PAPER   | PAGE         |
|--|--|--------------|
| Bray, Ulric B.; C. C. Moore, Jr., and David R. Merrill | Improvements in Diesel Engine Lubricating Oils   | Jl 38        |
| Brede, O. M.   | Has Maintenance Kept Pace with Transportation?   | Jn 35; Jl 32 |
| Brewster, Benjamin; Earl Bartholomew and Harold Chalk  | Carburetion, Manifolding and Fuel Antiknock Value  | Fe 36        |
| Bridgeman, O. C.                                       | Investigation of Vapor Lock in Aviation Fuel Systems                                     | No 20        |
| Bridgeman, O. C., and M. L. Leidig                     | Effect of Oil Characteristics on Wear in Aviation Engines                                | Fe 36; Oc 19 |
| Broughton, W. W.                                       | Die Castings   | Je 28        |
| Brown, A. George W.                                    | Problems of Lubrication in a Bus Fleet   | Mr 23        |
| Brown, R. W.   | Riding-Comfort Requirements  | My 17; No 27 |
| Brumbaugh, A. K.                                       | Fundamentals of Axle Engineering   | Jn 32        |
| Brumbaugh, A. K.                                       | Midwest Engineer's Comment on West Coast Operation                                       | Jn 34        |
| Brumbaugh, A. K.                                       | Six-Wheel Trucks   | My 34        |
| Brumbaugh, A. K.                                       | West Coast Truck Problems  | My 37        |
| Burnside, F. E., and R. H. Stalnaker                   | Equipment Maintenance in a State Highway Department                                      | Jn 23; Je 36 |
| Cameron, W. J.   | Engineering and Government   | Jl 18        |
| Campbell, Arch F.                                      | Economic Place of Automotive Oil Engines   | Fe 53        |
| Campbell, John M., and W. G. Lovell                    | Application of Statistical Concepts to the Knock-Rating Problem                          | Jl 39        |
| Campbell, Kenneth                                      | Cylinder Cooling and Drag of Radial-Engine Installations                                 | Jl 36        |
| Carmichael, T. J.                                      | Instruments  | Jl 32        |
| Carpenter, A.  | Weather Reports  | Jl 32        |
| Carpenter, D. M., and J. W. Van Doren                  | Factory Equipment and Tooling  | Fe 56        |
| Chalk, Harold; Earl Bartholomew and Benjamin Brewster  | Carburetion, Manifolding and Fuel Antiknock Value  | Fe 36        |
| Chapman, Edmund E.                                     | Operation and Maintenance of Diesel and Steam Locomotives in Expedited Passenger Service | No 12        |
| Chenoweth, Opie, and A. L. Berger                      | Supercharger Installation Problems   | Jl 35        |
| Child, L. W.   | Air Conditioning of Automobiles and Buses, Winter and Summer                             | Fe 15        |
| Christen, Harvey C.                                    | Influence of Design on Cost  | No 19        |
| Clements, Bishop                                       | Interpretation of Magnaflux Indications  | No 18        |
| Clower, James I.                                       | Selection and Application of Oil Filters   | My 30; No 36 |
| Collins, P. A., and J. M. Crawford                     | Experimental Procedure of Testing and Organization                                       | Jl 19        |
| Collins, R. J.   | Operation and Maintenance Problems of a Utility Fleet                                    | No 20        |
| Colwell, A. T.   | Modern Valve Engineering for Long Performance - Aircraft and Automotive                  | De 12        |
| Colwell, A. T.   | Valves and Valve Gears   | My 24        |
| Colwell, A. T.   | What the Parts Manufacturer Can Do to Reduce the Cost of Operation                       | De 22        |
| Connor, K. W.  | Surface Finish Related to Wear in Internal-Combustion Engines                            | My 38        |
| Cooke, Harte   | General Consideration of the Supercharging of Diesel Engines                             | Fe 34; Oc 19 |
| Couch, R. R.   | Vapor Lock Road Tests  | Jl 47        |
| Courtright, B. F.                                      | Quality Control in Steel Manufacture   | Je 21; No 38 |
| Crane, Capt. Carl J.                                   | Ground Training for Instrument Flying  | Ap 26; Oc 20 |
| Crawford, J. M.  | Requirement of Modern Engineering  | De 13        |
| Crawford, J. M., and P. A. Collins                     | Experimental Procedure of Testing and Organization                                       | Jl 19        |
| Crawford, K. B.  | The Flexi-Welder   | Je 20        |
| Critchfield, R. M.                                     | Effect of Proper Application on Maintenance of Automotive Electrical Equipment           | Jl 40        |
| Crockett, C. V.  | Engine Design  | My 32        |
| Crowley, Clyde A.                                      | The Evaluation of Extreme-Pressure Lubricants  | Jn 35        |
| Cummings, H. K.  | Rating Aviation Fuels in Full-Scale Aircraft Engines                                     | Jl 35        |
| Cummins, C. L.   | The Development of the Diesel Around Oil-Country Problems                                | Fe 53        |
| Dailey, E. B.  | Maintenance of the Streamliner "City of San Francisco"                                   | Jn 22; Je 36 |
| Danse, L. A.   | Precision Forging  | Jn 14; Se 24 |
| Darrow, B.   | Progress in Tire Design - 1932 to 1937   | Jn 34; Je 36 |
| Davey, Paul H.   | Truck-Driven Compressors and Allied Equipment  | Je 20        |
| Davies, G. L.  | Air-Track System of Aircraft Instrument Landings   | Fe 20; Oc 18 |
| Davis, C. H.   | Commercial Copper  | No 26        |
| Davis, G. H. B.; A. J. Blackwood, and C. G. Kass       | A Practical Approach to the Road Detonation Problem                                      | Jl 39        |
| Davis, Dr. H. N.                                       | Educating the Engineer   | Mr 23        |
| DeChard, A. W., and T. Tognola                         | Analysis of Improvements in Aviation Spark Plugs   | Fe 30; Oc 18 |
| DeFlorez, Luis   | Private Flying   | Ap 28; Oc 20 |
| DeLaubenfels, C. R.                                    | Drop-Hammer Applications   | Fe 55        |



# AUTHOR INDEX

| AUTHOR                                      | TITLE OF PAPER  | PAGE                |
|---|---|---------------------|
| Dickson, John                               | Two-Cycle Diesel Engines  | Ap 24               |
| Diederichs, W. J.                           | Automotive Metallurgy   | Fe 39               |
| Drake, Harley W.                            | Motor-Truck Transportation  | Ap 32               |
| Driggs, Ivan L.                             | Use of Generalized Logarithmic Graphs for the Calculation of Airplane Performance                                 | Fe 20               |
| Drinkard, W. E., and J. B. Macauley, Jr.    | Spark Advance and Octane Number - A Road-Test Technique   | Jl 39               |
| Dunham, Walter E.                           | The Transportation Container  | No 22               |
| Ebel, William K.                            | Operating Characteristics of Large Flying Boats   | Ap 28; (P) Ag 7     |
| Ebinger, Adam                               | Bus Maintenance as Related to Mass Transportation in an Urban Center  | De 14               |
| Eddy, Col. R. T.                            | Regulation of Transportation  | De 23               |
| Edgar, Graham                               | Knock-Testing in the Laboratory and in Service  | Jl 39; (P) Se 7     |
| Edwards, H. C.                              | Application of Fuel Injection Equipment Units   | Mr 23; Oc 21        |
| Egloff, Dr. Gustav                          | Newer Sources of Motor Fuels  | Ap 20               |
| Eisinger, J. O.                             | C.F.R. Knock-Testing Correlation Work (Discussion)  | Se 19               |
| Eldridge, L. C.                             | Relation of Cleanliness to Better Lubrication and Motor-Car Economy   | Jn 35               |
| Ellis, David                                | Airline Maintenance Methods   | Jl 32               |
| Esch, Dr. Ernst                             | The Motorization of Germany and the Competition Between Railway and Motor Car                                     | Jn 35               |
| Ewart, E. S.                                | Tire Design Factors Influencing Control of Vibration in Automobiles   | Jl 20               |
| Fahnestock, Murray                          | Cab-Astride Trucks  | Jn 24; Fe 56        |
| Faulkner, Fred L.                           | Rating a 14,000-lb. Gross-Vehicle-Weight Truck  | Jn 35               |
| Faulkner, Roy H.                            | The Automotive Engineer's Future  | Fe 14               |
| Fawcett, L. L.                              | Tuning Motors on a Chassis Dynamometer  | No 11               |
| Fawcett, L. L.                              | Why a Motor Tune-Up?  | Mr 24; Oc 20        |
| Fedden, A. H. R.                            | The Single Sleeve as a Valve Mechanism for the Aircraft Engine  | Jl 33               |
| Fisher, James B.                            | Comparison of Diesel, Hesselman, and Gas Power  | No 24               |
| Floyd, Robert K.                            | Observations on One Year's Lubrication Experience with Hypoids in the Low-Price Brackets and Related Commentaries | Fe 53               |
| Foster, Arch L.                             | Characteristics of Tomorrow's Lubricants  | Ap 24; No 36        |
| Foster, H. H., and E. G. Whitney            | The Diesel as a High Output Engine for Aircraft   | Fe 34               |
| Franzen, Tore                               | Recent Developments in Design of Passenger Vehicle Suspension Springs and Their Application                       | My 17; No 28        |
| Frey, Julian J.                             | Behind the Scenes of Today's and Tomorrow's Fuels   | De 14               |
| Fritts, C. E.                               | Motor-Vehicle Inspection  | Oc 12               |
| Gay, Errol J.                               | The Importance of Periodic Engine Tune-Up   | Je 20               |
| Gebhardt, W. A.                             | Recent Problems in Carburetor Development   | My 36               |
| Gebhardt, W. A.; F. C. Mock and E. O. Wirth | Highlights in Carburetion   | Mr 22; Oc 21        |
| Geisse, John H.                             | Future Aircraft Engines   | Jn 24; Ag 26        |
| Geisse, John H.                             | Private Flying  | Mr 21               |
| Geschelin, Joseph                           | An Appraisal of Current Progress in Automotive Manufacturing  | Fe 32; Oc 19        |
| Geschelin, Joseph                           | Lubrication of Special Running Gear Mechanism   | Jl 42               |
| Geschelin, Joseph                           | Mechanical Improvements in the New Cars   | De 16               |
| Glynn, F. K.                                | Operating a Fleet of Motor Vehicles   | My 36; Je 28; No 36 |
| Graham, Wellington R.                       | The History of Oil Filtration   | Mr 23               |
| Grumm, Fred                                 | The Economic Design of Highways   | Jn 22; Je 36        |
| Haddon, M. C., and Lloyd Stearman           | The Development of the Ultra-Safe Low-Cost Plane for Private Use  | Fe 38               |
| Hale, J. E.                                 | What Fleet Operators Should Know About Tires  | Fe 26; Ap 32        |
| Hale, J. E.                                 | Why Continue to Use High-Pressure Tires   | Je 20               |
| Hallanger, Norman                           | The Meteorologist's Job   | Fe 38               |
| Halsey, Maxwell N.                          | Traffic Efficiency  | My 33               |
| Hamilton, D. E.                             | Volatility and Performance Characteristics of Gasoline  | Je 28; No 38        |
| Hamilton, W. A.                             | Engine Maintenance from the Operator's Viewpoint  | Fe 54               |
| Hanley, W. V., and J. R. MacGregor          | Diesel-Engine Deposits as Influenced by Fuel Types and Operating Conditions                                       | Fe 34               |
| Harnett, C. A.                              | The Motor-Vehicle Administrator Looks at the Automobile   | Fe 15; Oc 19        |

# S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

| AUTHOR   | TITLE OF PAPER  | PAGE             |
|--|---|------------------|
| Harvey, J. A.                                    | Design and Maintenance of Thirty- and Forty-Passenger Buses             | Jn 35            |
| Haushalter, F. L.                                | Rubber as a Load-Carrying Material                                      | Ap 23; No 36     |
| Hawkins, P. E., and N. P. Larsen                 | Present and Future Trends in Public Utility Truck Bodies and Equipment  | Je 19            |
| Haynes, R. B.                                    | Recent Developments in Spline and Gear Cutting and Finishing            | Jn 25            |
| Hazen, R. M., and O. V. Montieth                 | Torsional Vibration in In-Line Engines                                  | Ap 14            |
| Heinlein, Fred                                   | Engine Deposits - Cause and Effect                                      | Je 20            |
| Heldt, P. M.                                     | Some Recent European Developments in High-Speed Diesel Engines          | Jl 37            |
| Hendrickson, N. E.                               | Trends in Commercial Vehicle Spring Suspension                          | De 25            |
| Herlihy, J. A.                                   | Safety in Air Transportation  | No 20            |
| Herman, F. W.                                    | Tricycle Landing Gear   | Oc 12            |
| Herrington, A. W. S.                             | Foreign Military Motor-Vehicles   | No 12            |
| Herrmann, K. L.                                  | The Barrel-Type Engine  | My 31            |
| Hester, Clinton M.                               | The Act, The Authority, and The Industry                                | No 10            |
| Hewitt, Carl T.                                  | Magnetic Testing of Ferrous Metals                                      | My 35            |
| Hicks, H. A., and G. H. Parker                   | Harshness in the Automobile   | Jl 20            |
| Holloman, Capt. George V.                        | Automatically Controlled Blind Landings                                 | Fe 20; (P) Je 13 |
| Horine, Merrill C.                               | Tire Sizes - Not More but Better  | De 10            |
| Horine, Merrill C.                               | Truck Performance   | My 30            |
| Horn, C. H.                                      | Brakes  | My 32            |
| Howe, T. C.                                      | Bus Maintenance Problems and Practices                                  | De 22            |
| Hutchinson, R. J.                                | Design Problems of Four-Wheel-Drive Trucks                              | Jl 31            |
| Hutchinson, R. V.                                | Do We Understand the Grinding Process?                                  | Jn 25            |
| Jabelmann, Otto                                  | Pioneering the Diesel Electric Streamliners                             | No 12            |
| Janeway, R. N.                                   | Quantitative Analysis of Heat Transfer in Engines                       | Je 21            |
| Jennings, Henry                                  | New Kinks in Live Truck Operations                                      | De 25            |
| Johnson, Frank E. H.                             | Automatic Transmissions and New Suspensions                             | Fe 39            |
| Johnson, Gen. Hugh S.                            | The Outlook for Business  | My 13            |
| Johnson, J. B.                                   | Magnaflux, What Does It Show?   | No 19            |
| Johnson, Hon. Louis                              | The Mechanization of the Army   | Jl 17            |
| Johnson, L. W.                                   | Multi-Cylinder Engine Adaptations in Oil Industry                       | No 20            |
| Johnson, Robert                                  | Relations between Engine and Aircraft Manufacturers                     | De 16            |
| Johnson, Robert E.                               | The Development of Successful Engine Installations                      | Fe 55            |
| Jones, C. S.                                     | Aviation  | My 37            |
| Kass, C. B.; A. J. Blackwood, and G. H. B. Davis | A Practical Approach to the Road Detonation Problem                     | Jl 39            |
| Kelsey, Lieut. Benjamin S.                       | Aviation  | My 34            |
| Kerley, R. V.                                    | American and Foreign Military and Commercial Aircraft                   | My 32            |
| Kettering, C. F.                                 | The Philosophy of Research  | Fe 13, Fe 15     |
| Keyser, Paul V.                                  | Lubrication - What, Where, When and How                                 | De 13            |
| Kimball, L. B.                                   | Accessory Knock Suppressors   | Fe 30; Oc 18     |
| Kirsten, F. K.                                   | Inventions  | My 30            |
| Kishline, Floyd F.                               | Observed Effects of Distribution, Engine Friction and Compression Ratio | Jl 22            |
| Klemin, Alexander, and E. B. Schaefer            | Practical Aerodynamics  | Fe 20; Oc 18     |
| Knight, Montgomery                               | The Technical Development of the Helicopter                             | No 38            |
| Kuhn, Paul                                       | Bending Stresses in Box Beams as Influenced by Shear Deformation        | Ap 26            |
| Lampton, G. T.                                   | Propeller Factors Tending to Limit Aircraft Engine Powers               | Ap 26            |
| Lansing, R. P.                                   | Analysis of the Accessory Drive Problem on Aircraft Engines             | Fe 30            |
| Lansing, R. P., and C. I. MacNeil                | Accessories and Flying Aids Contributing to Safety of Operation         | No 20            |
| Larsen, N. P., and P. E. Hawkins                 | Present and Future Trends in Public Utility Truck Bodies and Equipment  | Je 19            |
| Larson, C. M.                                    | Engine Deposits   | Ap 32; No 36     |
| Larson, C. M.                                    | Tractor Lubrication - Engine Wear                                       | My 38; No 38     |
| Laurie, G. W.                                    | Economic Maintenance of a Concentrated Fleet of Large Trucks            | Fe 26            |
| Leadbetter, Ralph                                | Evolution of Air Distribution in Ventilating Systems                    | No 24            |
| Leak, A. H.                                      | Coordinating Engine Design and Production                               | No 19            |
| Lederer, Jerome                                  | Notes on Loss Prevention in Civil Aviation                              | No 20            |
| Ledwinka, Joseph                                 | Body and Chassis Development  | My 18; No 28     |

# AUTHOR INDEX

| AUTHOR   | TITLE OF PAPER  | PAGE         |
|--|---|--------------|
| Leidig, M. L., and O. C. Bridgeman                     | Effect of Oil Characteristics on Wear in Aviation Engines                   | Fe 36; Oc 19 |
| Lenz, Arnold G.  | Cooperation between Production and Engineering                              | Jn 13        |
| Lichty, L. C.  | Analysis of Throttled Engine Operation                                      | Jl 22        |
| Lindsey, C. B.   | Automatic Transmissions in Buses  | My 35; No 28 |
| Lindsey, C. B.   | Cost Control in City Bus Operation  | De 22        |
| Linsenmeyer, F. J.                                     | Heating and Air Conditioning of Automobiles                                 | De 13        |
| Linville, Wallace                                      | Systematic Tune-Up Is Reducing Fleet Operating Costs                        | Fe 56        |
| Locke, C. D.   | Experience and Usefulness of a Synthetic Rubber - Known as Neoprene         | De 12        |
| Lombard, A. E., Jr.                                    | Designing for Safety  | No 20        |
| Lovell, W. G., and John M. Campbell                    | Application of Statistical Concepts to the Knock-Rating Problem             | Jl 39        |
| Macauley, J. B., Jr.                                   | C.F.R. Motor Survey   | Fe 36; Oc 19 |
| Macauley, J. B., Jr., and W. E. Drinkard               | Spark Advance and Octane Number - A Road-Test Technique                     | Jl 39        |
| Macauley, J. B., Jr., and W. E. Zierer                 | Tank Mileage  | Jl 22        |
| MacClain, A. Lewis                                     | Flight Testing  | Mr 22        |
| Mace, Gage   | Modern Airway Traffic Control   | Jl 31        |
| MacGregor, J. R., and W. V. Hanley                     | Diesel-Engine Deposits as Influenced by Fuel Types and Operating Conditions | Fe 34        |
| MacNeil, C. I., and R. P. Lansing                      | Accessories and Flying Aids Contributing to Safety of Operation             | No 20        |
| Marks, E. A.   | Motor Tune-Up   | My 32        |
| Marks, Earl  | Ignition Systems  | De 14        |
| Martin, A. D.  | Cars, Engines and Fuels   | Ap 22        |
| Mason, Paul  | Drivers' Tests  | Jn 33; Je 36 |
| Mathews, H. O.   | Economic Maintenance of a Scattered Fleet                                   | Fe 26        |
| Mathews, H. O.   | Twenty- to Twenty-Five-Passenger Bus Design from the Operator's Viewpoint   | Jn 35        |
| McCloud, J. L.   | Finishing Automotive Parts in Synthetic-Resin Enamels                       | Jn 16        |
| McConnell, Glenver                                     | Professionalizing Engineers   | Je 28        |
| McDonald, A. T.  | Some Interesting Developments Relative to Crankcase Oil Filtration          | Je 30; No 36 |
| McGinty, W. F.   | Constant-Speed Propellers   | Fe 38; Se 25 |
| McGuire, Col. E. C.                                    | Motor Maintenance in the Army   | De 12        |
| McIntyre, Gordon                                       | Gasoline  | De 14        |
| McMinn, Prof. B. T.                                    | Dynamic Loadings; Their Effect on Design and Materials                      | Mr 22        |
| Merrill, David R.; Ulric B. Bray, and C. C. Moore, Jr. | Improvements in Diesel Engine Lubricating Oils                              | Jl 38        |
| Metcalf, I. R.   | Recent Air Commerce Development in Instrument Landing                       | Ap 26        |
| Middlekamp, J. H.                                      | Prevention of Recurring Failures  | Mr 25        |
| Miller, Stuart P.                                      | Plastics and Recent Development   | De 12        |
| Mock, F. C.; E. O. Wirth and W. A. Gebhardt            | Highlights in Carburetion   | Mr 22; Oc 21 |
| Moller, J. A.  | What Is an E.P. Product?  | Fe 36; Oc 19 |
| Monson, Earl   | Iso-Thermal Manifold and Conditioned-Air Unit                               | Jn 30        |
| Montieth, O. V., and R. M. Hazen                       | Torsional Vibration in In-Line Engines                                      | Ap 14        |
| Moore, C. C., Jr.; Ulric B. Bray, and David R. Merrill | Improvements in Diesel Engine Lubricating Oils                              | Jl 38        |
| Moreland, Watt L.                                      | The West's Contribution to Low-Cost Motor-Vehicle Operation                 | De 11        |
| Morris, Major Joseph T.                                | Maintenance Problems of Army Airplanes                                      | Fe 55        |
| Mullen, T. H., and R. G. Booth                         | Depreciation  | De 22        |
| Mussey, W. H.  | Light Weight Passenger Cars Used in Steam Railroad Service                  | No 12        |
| Neely, W. H.   | Mechanics of Automobile-Body Styling, Design and Production Engineering     | Ap 32        |
| Newell, E. D.  | Supercharging of Diesel Engines   | Mr 25; Oc 21 |
| Newill, Edward B.                                      | Cold Facts with Tabasco Sauce   | Jn 32        |
| Newton, F. A.  | Some Interesting Facts about T.V.A.   | Je 19        |
| Newton, Gaylord W.                                     | A Survey of Mechanical Failures of Aircraft During 1936-37                  | No 20        |
| Newton, Leonard V.                                     | City Planning to Reduce Traffic Congestion                                  | Jn 33; Je 36 |
| Noble, Herbert J.                                      | Magnetic Testing of Ferrous Metals  | My 35        |
| Norris, R. F.  | Noise   | De 14        |
| North, J. R.   | Selection of Truck Chassis for Public Utility Use                           | Je 20        |
| Parker, G. H., and H. A. Hicks                         | Harshness in the Automobile   | Jl 20        |
| Paton, C. R.   | Notes on Controls and Calibration   | My 17        |



# S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

| AUTHOR                                   | TITLE OF PAPER   | PAGE                              |
|--|--|-----------------------------------|
| Patton, F. C.                            | How Well Do You Know Your Company?   | Jn 23; Je 36                      |
| Peirce, Thomas H.                        | Crankshaft Dampening and Motor Mountings   | Jl 20                             |
| Perkins, Kendall                         | Problems in High-Flight Engineering  | Jl 30                             |
| Pioch, William F.                        | Casting and Machining of Ford Cast-Steel Pistons                                   | Jn 14; Se 24                      |
| Pope, A. W., Jr.                         | Single-Cylinder Laboratory Test Engines  | My 33; No 36                      |
| Poulter, Dr. Thomas C.                   | The Effect of Pressures up to 1,500,000 Pounds                                     | Ap 24                             |
| Prentis, H. W., Jr.                      | Patriotism and Sound Industrial Practices  | De 7                              |
| Proudfoot, D. G., and R. C. Alden        | Some Improvements Relating to Seasonal Gasoline and Lubricating Oil                | Fe 53                             |
| Prutton, C. F., and A. O. Willey         | Testing of Hypoid Lubricants   | Ap 24                             |
| Pyles, Russell                           | Diesel Supercharging - Its Effect on Engine-Design Features and Performance        | Fe 34                             |
| Pyne, Frederick C.                       | Ten Years' Service Experience with Alclad Materials in Aircraft                    | No 10                             |
| Pyper, F. C.                             | Peculiar Machining Problems in the Automatic Transmission                          | Jn 25; Se 24                      |
| Rabazzana, Hector                        | Some Factors Controlling Part Load Economy   | Jl 22                             |
| Rabazzana, Hector                        | Spark Plugs and Their Relation to Motor Efficiency                                 | De 14                             |
| Ragsdale, E. J. W.                       | Engineering for Production in Stainless Steel                                      | Fe 55                             |
| Rassweiler, Gerald M., and Lloyd Withrow | High-Speed Motion Pictures of Engine Flames Correlated with Pressure Cards         | Fe 36                             |
| Rendel, T. B.                            | Diesel Fuel Requirements   | My 36                             |
| Rigg, D. B.                              | Testing Lighting and Safety Devices  | Oc 12                             |
| Roberts, W. A., and W. H. Yenni          | Test Procedure and Instrumentation for Maintenance of Gasoline Engines             | De 24                             |
| Roensch, Max M.                          | Superfinish  | De 12                             |
| Rosen, C. G. A.                          | Diesel Oddities  | Jl 38                             |
| Round, George A.                         | Why Drain Crankcases and When  | Mr 23                             |
| Ryder, F. A., and C. J. Vogt             | Automotive Research at the University of California                                | De 22                             |
| Sabina, J. R.                            | Correlation of Road and Laboratory Octane Numbers                                  | Jl 39                             |
| Sanders, Robert                          | Carburetor Icing   | Ap 14; Oc 20                      |
| Schaefer, E. B., and Alexander Klemin    | Practical Aerodynamics   | Fe 20; Oc 18                      |
| Schildhauer, C. H.                       | Practical Aspects of Transocean Flying   | Ap 28; Oc 20                      |
| Schon, Pierre                            | March of Progress in the Development of Transportation Technology and Unemployment | Ap 20                             |
| Scoville, John W.                        | The Performance of Automotive Lighting Devices                                     | Jl 18, Jl 30                      |
| Sharkey, W. R., and L. Boelter           | Economic Maintenance of a Concentrated Fleet of Mixed Vehicles                     | Jn 33                             |
| Shaw, S. B.                              | Overhead   | Fe 26; Oc 18                      |
| Shaw, S. B.                              | Automotive Two-Cycle Diesel Engines  | De 22                             |
| Shoemaker, F. G.                         | Engine Installation and Related Problems in Large Aircraft                         | Jl 38                             |
| Shogran, I. L.                           | Bringing the Private Owner's Airplane Up to Date                                   | Fe 30                             |
| Short, Mac                               | Vapor Lock   | Fe 54                             |
| Sibley, B. E.                            | Why Use Good Lubricating Oils?   | Jl 47                             |
| Sloan, R. R.                             | Navigating the Clipper Ships   | Jn 40                             |
| Smith, George M.                         | Retreading   | Oc 12                             |
| Smith, Philip H.                         | Your Society   | Jn 35                             |
| Smith, Philip H.                         | Your Society - The President   | (P) Mr 13                         |
| Smith, Philip H.                         | Your Society - The Council   | (P) Ap 17                         |
| Smith, Philip H.                         | Your Society - The Committees  | (P) My 20                         |
| Smith, Philip H.                         | Your Society - Standards   | (P) Je 22                         |
| Smith, Philip H.                         | Your Society - S.A.E. Research   | (P) Ag 14                         |
| Smith, Philip H.                         | Your Society - S.A.E. Relations with Outside Agencies                              | (P) Oc 7                          |
| Smith, R. M.                             | Europe's Roads   | (P) De 17                         |
| Smith, T. W.                             | History of Engineering Branch of Motor Transport Division of Quartermaster Corps   | My 34                             |
| Snead, J. L. S., Jr.                     | Truck Maintenance Problems   | Je 29                             |
| Sneed, Richard                           | An Investigation of Some of the Fundamentals of Supercharging                      | Jn 32                             |
| Sparrow, Stanwood W.                     | Safe Viscosity for a Motor Car Engine Lubricant                                    | My 14; No 27                      |
| Sperry, L. B.                            | Hardened Crankshafts and Cylinders   | Jl 42                             |
| Spicer, C. W.                            | New Firing Lines for Engineers   | My 39; No 38                      |
| Spicer, C. W.                            | Standardization and Research Horizons  | Ap 32; My 32, My 34; No 25, No 26 |
| Spicer, C. W.                            | Universal Joints   | Jn 23; Se 25                      |
| Springer, Eric                           | Production Control   | No 12                             |
|  |  | Fe 55                             |



# AUTHOR INDEX

| AUTHOR                                      | TITLE OF PAPER   | PAGE                              |
|---|--|-----------------------------------|
| Staley, Allen C.                            | Temperature Sensations in Automobile Bodies  | De 13                             |
| Stalnaker, R. H., and F. E. Burnside        | Equipment Maintenance in a State Highway Department  | Jn 23; Je 36                      |
| Stanard, C. H.                              | The Economical Mass Production of Accurate Gears   | Jn 25; Se 24                      |
| Stearman, Lloyd, and M. C. Haddon           | The Development of the Ultra-Safe Low-Cost Plane for Private Use                           | Fe 38                             |
| Stout, William B.                           | Looking Ahead in Engineering   | No 25; De 26                      |
| Taub, Alex                                  | Motor Car Engines in England   | My 14                             |
| Taylor, Clarence P.                         | Technical Progress in Safety Promotion on Rural Highways                                   | Jn 30; Ag 26                      |
| Tea, Clark A.                               | Automobile Seat Cushions and Riding Comfort; Report from Riding Comfort Research Committee | (P) Jl 26                         |
| Teetor, Macy O.                             | Reduction of Piston-Ring and Cylinder Wear   | Fe 36; Mr 23; My 34, My 36, My 39 |
| Thomas, Dr. James S.                        | New Frontiers for Smart People   | My 23; Je 29                      |
| Thompson, Prof. J. T.                       | The Outlook Toward Legal Performance Requirements  | Fe 25                             |
| Tilley, N. N.                               | Engines for Light Airplanes  | Ap 28; Oc 20                      |
| Tognola, T., and A. W. DeChard              | Analysis of Improvements in Aviation Spark Plugs   | Fe 30; Oc 18                      |
| Toulmin, H. A., Jr.                         | Cost of National Defense   | Jl 31                             |
| Tourtellot, Major George B.                 | The Air Force in the Scheme of National Defense  | De 13                             |
| Townsend, L. M., and A. L. Beall            | Hi-Duty Spark Plug Testing   | My 33                             |
| Treiber, O. D.                              | High-Speed Heavy-Duty Diesel Engines in Industry   | Mr 25; Oc 21                      |
| Trippe, Juan T.                             | America's Position in World Air Commerce   | Ap 13                             |
| Twining, E. S.                              | Tractor Spark-Plugs  | My 39; No 38                      |
| Underwood, Arthur F.                        | Automotive Bearing Materials and Their Application   | Jl 23                             |
| Upson, Ralph                                | The Use of Self-Tapping Screws in Mechanical and Structural Assemblies                     | Fe 32; Oc 19                      |
| Vance, J. W.                                | Sales Promotion  | Ap 23                             |
| Van Deventer, John H.                       | If We Don't Hang Together, We Shall All Hang Separately                                    | Mr 21; Oc 20                      |
| Van Deventer, John H.                       | The Economic Outlook   | De 13                             |
| Van Doren, J. W., and D. M. Carpenter       | Factory Equipment and Tooling  | Fe 56                             |
| Van Halteren, A. S.                         | Fundamentals of Heat Transmission Applied to Wheels and Brakes                             | Je 21                             |
| Verbarg, L. J.                              | Air Conditioning of Buses, Railcars and Coaches  | No 23                             |
| Vogt, C. J., and F. A. Ryder                | Automotive Research at the University of California  | De 22                             |
| Wallace, David A.                           | Purchasing, Planning, and Scheduling Parts for Building Multiple-Model Automobiles         | Jn 16                             |
| Warner, John A. C.                          | The Significance of the S.A.E.   | No 12                             |
| Warner, John A. C.                          | Truth Through Torture  | My 32, My 34; No 25, No 26        |
| Watson, R. A.                               | Bearing Failures   | Ap 32                             |
| Watson, R. A.                               | Engine Bearing Processing and Its Effects  | Fe 42; Se 25                      |
| Weaver, Francis S.                          | The Importance of Motor Tune-Up  | Jn 34; Je 36                      |
| Weaver, H. G.                               | Human Relationships  | Jl 46                             |
| Webber, H. M.                               | Brazing Materials in Controlled Atmosphere Electric Furnaces                               | Jn 30                             |
| Weber, E. F.                                | Diesel Power for High-Speed Railway Service  | No 11                             |
| Weeks, Paul                                 | Slow and Medium-Speed Diesel Engines   | Mr 25; Oc 22                      |
| Weinberg, H. L.                             | Some Aspects of Recent Streamlined Train Design  | My 35; No 28                      |
| White, S. O.                                | Transmission and Control Developments  | My 16; No 27                      |
| Whitmer, V. W.                              | Stainless Steel in Aircraft  | No 18                             |
| Whitney, E. G., and H. H. Foster            | The Diesel as a High Output Engine for Aircraft  | Fe 34                             |
| Wiles, Howard M.                            | Dust House Testing   | My 39; No 38                      |
| Willey, A. O., and C. F. Prutton            | Testing of Hypoid Lubricants   | Ap 24                             |
| Williams, J. S.                             | Recent Developments of Resistance Welding  | Jn 15                             |
| Wilson, Billings                            | Truck Problems in Tunnel Operation   | Mr 25                             |
| Wilson, G. W.                               | Diesel-Electric Bus Drive  | De 23                             |
| Winans, E. W.                               | Cab-Over-Engine Design   | Jn 35                             |
| Wirth, E. O.; W. A. Gebhardt and F. C. Mock | Highlights in Carburetion  | Mr 22; Oc 21                      |
| Withrow, Lloyd, and Gerald M. Rassweiler    | High-Speed Motion Pictures of Engine Flames Correlated with Pressure Cards                 | Fe 36                             |
| Wolf, Austin M.                             | Trends in Design of 1939 Cars  | No 9                              |
| Wolf, Austin M.                             | Trends in 1938 Car Design  | Jn 32                             |
| Woolson, Harry T.                           | A Long Range View of Automotive Engineering  | Jn 30                             |
| Wright, T. P.                               | Airplane Developments and Safety in Aviation   | Jl 30                             |
| Yates, B. A.                                | Recent Developments in Piston-Ring Materials   | Ap 22; No 28                      |

| AUTHOR                                 | TITLE OF PAPER   | PAGE  |
|--|--|-------|
| Yenni, W. H., and W. A. Roberts        | Test Procedure and Instrumentation for Maintenance of Gasoline Engines | De 24 |
| Young, F. M.                           | Lugine Cooling Problems  | Fe 54 |
| Young, G. P.                           | Plastics in Aircraft   | Fe 55 |
| Youngren, H. T.                        | Automatic Transmissions  | Mr 24 |
| Zierer, W. E., and J. B. Macauley, Jr. | Tank Mileage   | Jl 22 |

## Subject Index

| A  | PAGE                                     | Aircraft Design and Construction (Continued)      | PAGE                                     |
|--|--|---|--|
| <b>Accidents and Accident Prevention</b>           |  | Filleting   | Fe 20                                    |
| Accident types, "approaching" and "overtaking"     | Jn 22                                    | Flying boat                                       |  |
| Aircraft   |  | Design trends                                     | Ap 28, Ap 29                             |
| Accessories  | No 20                                    | Hull design                                       | Ag 9                                     |
| Design factors                                     | Jl 30                                    | "Porpoising"                                      | Ap 28, Ap 29                             |
| Diesel engine effects                              | Fe 34                                    | Seaworthiness                                     | Ap 29                                    |
| Dubl-Chek instrument board                         | No 20                                    | Flying-model merits                               | Ap 28                                    |
| Failures, mechanical, review of                    | No 20                                    | Helicopter  |  |
| Fire extinguishers, warning about                  | No 20                                    | Definition of                                     | No 38                                    |
| Landing  | Fe 38; Oc 12, Oc 18                      | Problems involved                                 | No 38                                    |
| Navigation, means to insure accuracy of            | Oc 13                                    | Progress  | No 38                                    |
| Pilot as factor                                    | No 20                                    | Landing gear                                      |  |
| Precision-flying effects                           | Mr 22                                    | Air-Track system                                  | Oc 18                                    |
| Progress   | No 20                                    | Army instrument type                              | Je 16, Je 18                             |
| Automobile   |  | Blind landing                                     | Ap 26                                    |
| Design factors                                     |  | Bureau of Air Commerce development                | Ap 26                                    |
| Air conditioning                                   | Fe 17                                    | Instrument landing                                | Ap 26                                    |
| Engine location                                    | Fe 16                                    | Massachusetts Institute of Technology development | Ap 26                                    |
| Glass, safety                                      | Jn 20                                    | Requirements                                      | My 33                                    |
| Headlighting                                       | Jn 33, Jn 34; Fe 15, Fe 16; Je 30; Oc 19 | Single instrument                                 | Ap 26                                    |
| Lighting   | Jn 33                                    | Three-spot system                                 | Ap 26                                    |
| Steering system                                    | My 16                                    | Tricycle type                                     | Fe 38; Oc 12, Oc 13                      |
| Visibility   | Jn 33, Jn 34; Fe 15, Fe 16; Oc 19        | Light airplane                                    |  |
| Driver responsibility                              | Fe 15                                    | Definition  | Ap 28                                    |
| Motor-vehicle administrators' views of             | Fe 15, Fe 16                             | Weight  | Oc 20                                    |
| Speed factor                                       | Fe 15, Fe 16; Oc 19                      | Makes   |  |
| Automotive Safety Foundation                       | De 17                                    | Boeing  | Jl 30, Jl 31                             |
| Causes analyzed                                    | Jn 33                                    | Curtiss-Wright                                    | No 20                                    |
| Human factors                                      |  | Douglas   | Fe 31; My 32; Jl 30; Se 25; Oc 12; No 20 |
| Judgment   | Jn 33                                    | Gwinn   | Fe 20                                    |
| Vision   | Jn 33                                    | Lockheed  | Jl 30                                    |
| Lighting equipment                                 | Jn 21                                    | Martin  | Ap 29                                    |
| Motorcoach   |  | Military  | Oc 18                                    |
| Air conditioning                                   | Fe 17                                    | Multi-engine design                               | Fe 31                                    |
| Glass, safety                                      | Jn 20                                    | Performance calculations                          | Fe 20                                    |
| Motor-truck  |  | Plastics used in                                  | Fe 55                                    |
| Design factors                                     |  | Privately owned                                   |  |
| Glass, safety                                      | Jn 20                                    | Biplane merits                                    | Fe 20                                    |
| Headlighting                                       | Jn 33, Jn 34                             | Design requirements                               | No 38                                    |
| Equipment factor                                   | Oc 12                                    | Engine requirements                               | Ap 28; No 38                             |
| Noise effects                                      | De 14                                    | Improvements                                      |  |
| Physiological factor                               | Je 30                                    | Needed  | Ap 28                                    |
| Preventives  |  | Suggested   | Ap 28                                    |
| Driver testing                                     | Jn 33; Je 36                             | Light airplane defined                            | Ap 28                                    |
| Inspection   | Oc 12                                    | Progress  | Fe 54                                    |
| Limited licenses                                   | Jn 33                                    | Production  |  |
| Road factor  | Je 36; Ag 26; Oc 12                      | Cost factor                                       | No 19                                    |
| Road lighting factor                               | Jn 22; Je 30                             | Data on   | No 10                                    |
| S.A.E. contribution to                             | De 18                                    | Design coordination with                          | No 19                                    |
| <b>Aeronautical Chamber of Commerce of America</b> | No 10                                    | European equipment                                | Fe 56                                    |
| <b>Air Cleaners</b>                                |  | Problems  | Fe 56                                    |
| Air-conditioning requirements                      | De 13                                    | Quantity production relation to                   | Fe 56                                    |
| Dust-content, data on                              | De 13                                    | Surface finish measurement                        | No 18                                    |
| <b>Air Corps</b>                                   |  | Progress  | No 10                                    |
| (See United States Army Air Corps)                 |  | Propeller   |  |
| <b>Aircraft Design and Construction</b>            |  | Autogyro rotor compared with                      | Ap 27                                    |
| Accessories  |  | Blade number                                      | Ap 27                                    |
| Future predicted                                   | No 20                                    | Blade weight factor                               | Jl 30                                    |
| Types of   | No 20                                    | Constant-speed, merits                            | Se 25                                    |
| Aerodynamics                                       | Fe 20; Oc 18                             | Design problems                                   | Jl 30                                    |
| Auxiliary equipment, powerplant for                | Oc 12                                    | Engine size affected by                           | Ap 27                                    |
| Box-beam problem                                   | Ap 26                                    | Feathering  | Oc 12                                    |
| Cabins, pressurized                                | Jl 31                                    | Makes, Hamilton                                   | Se 25                                    |
| Corrosion prevention                               | No 10, No 18                             | Materials used                                    | Ap 26, Ap 27                             |
| Cost factor  | No 19                                    | Size trends                                       | Ap 27                                    |
| Design requirements                                | Fe 56                                    | Small plane requirements                          | Ap 27                                    |
| Engine installation problems                       | Fe 31, Fe 55                             | Stratosphere flight requirements                  | Ap 26, Ap 27                             |
|  |  | Stress variation measurement                      | Jl 30                                    |
|  |  | Trends  | Ap 27; Jl 30                             |
|  |  | Weight factor                                     | Ap 27                                    |

# SUBJECT INDEX

## Aircraft Design and Construction (Concluded)

|                                    |              |
|------------------------------------|--------------|
| Weight reduction                   |              |
| Methods of                         | Ap 26, Ap 27 |
| Need for                           | Ap 26        |
| Weight trends                      | Jl 30        |
| Safety features                    | No 20        |
| Standardization, importance of     | Fe 56        |
| Steels, stainless                  | Fe 55; No 18 |
| Stresses                           | Ap 26        |
| Vibration elimination, progress in | Fe 32        |
| Wings                              |              |
| Surface finish                     | Jl 30        |
| Tip design improvement             | Jl 30        |

(See also Accidents and Accident Prevention, Aircraft; Aircraft Operation and Performance; Aviation; Engines, Aircraft; and Instruments, Aircraft)

## Aircraft Operation and Performance

|   |                                   |
|---|-----------------------------------|
| AUTOMATICALLY CONTROLLED BLIND LANDINGS         | Fe 20; Je 13                      |
| OPERATING CHARACTERISTICS OF LARGE FLYING BOATS | Ap 28; Ag 7                       |
| Altitude range                                  | Jl 30                             |
| Cost, precision flying effects                  | Mr 22                             |
| Flight plan                                     | Oc 20                             |
| Flight testing                                  |                                   |
| Items tested                                    | My 30                             |
| Reasons for                                     | My 30                             |
| Flying boat                                     |                                   |
| Airplane compared with                          | Ap 28; Ag 7                       |
| Beam loadings                                   | Ag 8                              |
| Control   | Ag 10, Ag 11                      |
| Design effects                                  | Ap 28                             |
| Equipment trends                                | Ag 11                             |
| Flight characteristics                          | Ag 10                             |
| Flight conditions, airplane compared with       | Ag 7                              |
| Future predicted                                | Ap 29                             |
| Landing   | Ap 28, Ap 29; Ag 10, Ag 11        |
| Models, flying-scale                            | Ag 12                             |
| Operating characteristics                       | Ag 8                              |
| Operating conditions, airplane compared with    | Ag 7                              |
| Pilot duties                                    | Ag 11                             |
| Porpoising                                      | Ag 9                              |
| Seaworthiness                                   | Ap 29; Ag 12                      |
| Size factor                                     | Ag 10                             |
| Take-off  | Ap 28, Ap 29; Ag 9, Ag 10, Ag 11  |
| Terminal facilities, suggestion for             | Ap 29                             |
| Testing, flying model used                      | Ag 12                             |
| Water-handling characteristics                  | Ag 8                              |
| Weather effects                                 | Ap 29                             |
| Weight effects                                  | Ag 8                              |
| Wing flap effects                               | Ag 10                             |
| Flying-model merits                             | Ap 28                             |
| Future predicted                                | Jl 30                             |
| Ice formation, causes                           | Fe 38                             |
| Instrument flying                               | Mr 21, Mr 22; My 34               |
| Landing   |                                   |
| Automatic                                       |                                   |
| Altitude control                                | Je 13, Je 16                      |
| Factors involved                                | Je 13                             |
| Flap angle effects                              | Je 14                             |
| "Let-down"                                      | Je 14, Je 15, Je 16, Je 18        |
| Procedure described                             | Je 13, Je 16                      |
| "Slow cruise"                                   | Je 13, Je 14, Je 15, Je 16, Je 18 |
| Instrument landing                              |                                   |
| Automatic                                       | Fe 25                             |
| Factors involved                                | Fe 25                             |
| History   | Fe 20                             |
| Importance of                                   | Fe 25                             |
| Progress  | Fe 20, Fe 25; Ap 26; Mv 34        |
| Simplification urged                            | Fe 25                             |
| Systems   |                                   |
| Air-Track                                       | Fe 20                             |
| Flightray                                       | Fe 25                             |
| Three-light dial                                | Fe 25                             |
| Three-spot                                      | Ap 26                             |
| Tricycle landing gear                           | Fe 25                             |
| Landing gear effects                            | Fe 38                             |
| Safety features                                 | Jl 30                             |
| Maintenance                                     |                                   |
| Army Air Corps system                           | Fe 55                             |
| Data on   | Jl 32                             |
| Design factors                                  | Fe 56                             |
| Progress  | Fe 55                             |

## Aircraft Operation and Performance (Concluded)

|   |  |
|---|--|
| Makes   |  |
| Martin  | Ap 29; Ag 8, Ag 9, Ag 10, Ag 11, Ag 12 |
| N.C.  | Ag 12                                  |
| Meteorologist, function of                    | Fe 38                                  |
| Navigation, means to insure accuracy of       | Oc 13                                  |
| Noise reduction                               |  |
| Cost factor                                   | Fe 18                                  |
| Method described                              | Fe 18                                  |
| Problem stated                                | Fe 18                                  |
| Payload, propeller effects                    | Fe 38                                  |
| Piloting                                      |  |
| Blind   | Oc 20                                  |
| Instrument                                    | Oc 20                                  |
| Instrument landings, simplification predicted | Ap 13                                  |
| Precision flying                              |  |
| Accuracy of                                   | Mr 21                                  |
| Cost decreased by                             | Mr 22                                  |
| Factors affecting                             | Mr 21                                  |
| Safety increased by                           | Mr 22                                  |
| Speed increased by                            | Mr 21                                  |
| Pilot training                                |  |
| Ground training                               | Oc 20                                  |
| Link Trainer                                  | Ap 26; Oc 20                           |
| Problems                                      | Ap 26                                  |
| Precision flying                              | Mr 21, Mr 22                           |
| Private flying                                |  |
| Airmanship                                    | Ap 28                                  |
| Automobile compared with                      | Ap 28                                  |
| Cost  | Fe 38; Oc 20                           |
| Cost reduction, recommendation for            | No 38                                  |
| Definition                                    | Oc 20                                  |
| Extent of                                     | Ap 28                                  |
| Government assistance needed                  | Ap 28                                  |
| Government cooperation                        |  |
| Domestic                                      | Mr 21                                  |
| Foreign                                       | Mr 21                                  |
| Improvements suggested                        | Mr 21                                  |
| Landing facilities                            | Mr 21                                  |
| Landing field requirements                    | Ap 28                                  |
| Progress                                      | Fe 38                                  |
| Speeds, cruising and landing                  | Oc 20                                  |
| Suggestion regarding                          | No 38                                  |
| Trends  | Ap 28                                  |
| Propellers, constant-speed                    |  |
| Payload affected by                           | Fe 38                                  |
| Speed affected by                             | Fe 38                                  |
| Radio, static                                 |  |
| Classification                                | Fe 38                                  |
| Occurrence                                    | Fe 38                                  |
| Simplification, need for                      | Je 13                                  |
| Speed   |  |
| Cowling shape effects                         | Jl 30                                  |
| Increase in                                   | Jl 30                                  |
| Propeller effects                             | Fe 38                                  |
| Wing effects                                  | Jl 30                                  |
| Stability                                     |  |
| Problems of                                   | Oc 18                                  |
| Stagger-decalage effects                      | Oc 18                                  |
| Transoceanic                                  | Oc 13, Oc 20                           |
| Vibration elimination, progress in            | Fe 32                                  |
| Weather conditions                            |  |
| Meteorological information                    | Fe 38                                  |
| Norwegian Air-Mass Analysis                   | Fe 38                                  |

(See also Accidents and Accident Prevention, Aircraft; Aircraft Design and Construction; Aviation; Engines, Aircraft; and Instruments, Aircraft)

## Air Transport Association of America

Mr 16; No 10

## Aluminum and Aluminum Alloys

|                    |              |
|--------------------|--------------|
| Alclad             | No 10, No 18 |
| Chrome plating     | Fe 39        |
| Service experience | No 10, No 18 |

## American Association of Motor Vehicle Administrators

Fe 15; Oc 19

## American Association of State Highway Officials

Jn 30; Ag 26

## American Petroleum Institute

Jn 21; Mr 14; Jl 47; Oc 19; De 17

## American Society for Testing Materials

Ag 16; No 38; De 17

## Abbreviations Used:

|              |           |
|--------------|-----------|
| January, Jn  | April, Ap |
| February, Fe | May, My   |
| March, Mr    | June, Je  |

## Months of the Year

|               |              |
|---------------|--------------|
| July, Jl      | October, Oc  |
| August, Ag    | November, No |
| September, Se | December, De |

## S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

|   | PAGE                |   | PAGE                       |
|---|---------------------|---|----------------------------|
| <b>American Society of Agricultural Engineers</b>                   | Mr 17               | <b>Automobile Operation and Performance (Concluded)</b>                 | Fe 18                      |
| <b>American Society of Mechanical Engineers</b>                     |                     | Vibration factor  | De 14                      |
| Jn 20; Mr 14, Mr 25; My 27, My 28; De 16                            |                     | Wind-rustle effects   |                            |
| <b>American Standards Association</b>                               |                     | Vibration   |                            |
| Jn 20; Ag 14, Ag 16; De 17, De 18                                   |                     | Harshness analyzed  | Jl 20                      |
| <b>American Welding Society</b>                                     | Jn 15; My 28        | Reduction means   | Jl 20                      |
| <b>Army</b>   |                     | (See also Accidents and Accident Prevention, Automobile; Automobile     |                            |
| Automotive problems   | Jl 17, Jl 18        | Design and Construction; Axles; Bodies; Brakes; Clutches;               |                            |
| Aviation, landing, automatic  | Je 13               | Engine Operation and Performance; Fleet Operation; Lubri-               |                            |
| Dynamometer laboratory  | Fe 26               | cants and Lubrication; Riding-Qualities; Shock-Absorbers;               |                            |
| Industrial mobilization   | Jl 31               | Springs, Suspension; Tires and Rims; and Transmissions)                 |                            |
| Maintenance, motor-vehicle  | De 12, De 22        |   |                            |
| Maintenance problems  | Fe 55               | <b>Automotive Industry</b>  |                            |
| Mechanical aptitude of soldiers                                     |                     | Cooperation between production and engineering                          | Jn 13                      |
| American  | Jl 18               | Economic benefits, Canadian   | Se 21                      |
| Foreign   | Jl 18               | Engineering   |                            |
| Procurement planning  | Fe 55               | Car development problems  | Jl 19                      |
| Quartermaster Corps, Engine Branch of Motor Transport               |                     | Cost variation  | Jl 19                      |
| Division  | Je 29               | Organization  | Jl 19                      |
| S.A.E. cooperation  | Jl 17               | Growth  | De 17, De 18               |
| Standardization of equipment needed                                 | Jl 18               | Importance of   | My 32, My 34               |
| Tank problems   | Jl 18               | Radio   | De 17                      |
| <b>Association of Licensed Automobile Manufacturers</b>             |                     | Railroad cooperation with   | Fe 13, Fe 14               |
|   | Mr 14; Ag 14        | Research contribution to  | Ap 33                      |
| <b>Automobile Design and Construction</b>                           |                     | S.A.E. value to   | No 20                      |
| Air conditioning  | Fe 17, Fe 18        | Sales   |                            |
| Appearance  | De 16               | Car registration effects  | Ap 23                      |
| Car development problems  | Jl 19               | New-car-to-used-car ratio   | Ap 23                      |
| Cost control  | My 17; No 27        | Used car problem  | Ap 23                      |
| Electrical equipment standardization                                | Mr 16               | Used-car-to-new-car ratio   | Ap 23                      |
| Finishes, synthetic-resin enamels                                   | Jn 16               | Statistics, Canadian  | Mr 22                      |
| Future predicted  | My 13               | Television effects foreseen   | De 17                      |
| Improvements classified   | De 16               | Tests, importance of  | My 32, My 34               |
| Laboratory tests  |                     | Value, Canadian statistics  | Mr 22                      |
| Endurance testing   | Jn 31               | Welding industry's contribution to                                      | Jn 15                      |
| Field tests correlated with   | Jn 31               | <b>Automotive Safety Foundation</b>                                     | De 17                      |
| Improvements resulting from   | Jn 31               | <b>Aviation</b>   |                            |
| Value of  | Jn 31               | Commercial  |                            |
| <b>Makes</b>  |                     | Cost, operating, reduction in   | Mr 22                      |
| Buick   | Jn 32; Fe 39        | Flying boat use   | Ap 29                      |
| Cadillac  | Jn 15, Jn 32        | Government assistance, need for   | Ap 14                      |
| Chevrolet   | Jl 19               | Importance of   | Ap 13                      |
| Chrysler  | My 18; De 12        | Precision flying  | Mr 21, Mr 22               |
| Elmore  | Ag 20               | Insurance losses  | No 20                      |
| Ford  | Jn 14; De 16        | Legislation, need for   | Ap 13                      |
| Graham  | Jn 32               | Manly Memorial Medal  | Fe 39; Ap 14, Ap 15        |
| Lincoln   | Jn 32; My 18        | Meteorologist, function of  | Fe 38                      |
| Oldsmobile  | Jn 32               | Military  | My 33, My 34; Oc 18        |
| Stout Scarab  | Ap 32               | Private flying  |                            |
| <b>Production</b>   |                     | Cost  | Oc 20                      |
| Progress  | Oc 19               | Definition  | Oc 20                      |
| Screws, self-tapping  | Oc 19               | Factors retarding growth  | Oc 20                      |
| Progress  | De 16               | Foreign and domestic compared   | Mr 21                      |
| Show, student-sponsored   | Jn 32               | Future predicted  | Mr 21                      |
| <b>Stress concentrations</b>  |                     | Governmental encouragement needed                                       | Oc 20                      |
| Factors affecting   | Mr 22               | Progress  | Fe 38; My 34, My 37; No 10 |
| Load, impact and static, compared                                   | Mr 22               | Radio   | Fe 38                      |
| <b>Testing</b>  |                     | Terminal facilities   | Ap 29                      |
| Dynamometer   | Jl 19               | Trans-oceanic   |                            |
| Field   | Jl 19               | Flying boat use   | Ap 29; Oc 20               |
| Proving ground  | Jl 19               | Future predicted  | Ap 29                      |
| Trends  | Jn 32; No 9         | Weather effects   | Fe 38                      |
| Welding effects   | Jn 15               | Wright Brothers Medal   | Fe 39; My 28, My 33; No 19 |
| (See also Accidents and Accident Prevention, Automobile; Automobile |                     | (See also Accidents and Accidents Prevention, Aircraft; Aircraft Design |                            |
| Operation and performance; Axles; Bodies; Brakes; Clutches;         |                     | and Construction; Aircraft Operation and Performance; En-               |                            |
| Engine Design and Construction; Finishes; Foreign Design            |                     | gines, Aircraft; and Instruments, Aircraft)                             |                            |
| and Operation; Frames; Gears; Headlighting; Production;             |                     |   |                            |
| Riding-Qualities; Shock-Absorbers; Springs, Suspension;             |                     | <b>Axles</b>  |                            |
| Tires and Rims; and Transmissions)                                  |                     | Engineering fundamentals  | Jn 32                      |
| <b>Automobile Manufacturers Association</b>                         | Fe 25; Mr 14; De 17 | Fatigue resistance improved   | Jn 31                      |
| <b>Automobile Operation and Performance</b>                         |                     | Deflection tests  | My 23; No 38               |
| Cost data   | No 20               | Lubricant requirements  | Fe 36                      |
| Depreciation  |                     | Reduction gears, hypoid   | My 24                      |
| Factors affecting   | Jn 35, Jn 40        | Testing   | Jn 31; My 23; No 38        |
| Industrial equipment compared with                                  | Jn 35               |   |                            |
| <b>Lubricants and lubrication</b>                                   |                     | <b>B</b>  |                            |
| Chassis lubrication   | Jl 42               | <b>Batteries, Standardization</b>                                       | Mr 16                      |
| Lubricant types required  | Jl 42               | <b>Bearings</b>   |                            |
| Problems  | Jl 50               | Ball and roller, testing  | Jn 31                      |
| <b>Noise</b>  |                     | Engine  |                            |
| Driver affected by  | De 14               | Failure   |                            |
| Reduction   |                     | Causes  | Fe 42; Je 30               |
| Cost factor   | Fe 18               | Load effects  | Je 30                      |
| Importance of   | Fe 19               | Lubricant effects   | Ap 32; Jl 24               |
| Improvements needed   | Fe 18               | Oil clearance relation to   | Ap 32                      |
| Methods described   | Fe 18               | Preventive  | Jl 2                       |



# SUBJECT INDEX

|   | PAGE                              |   | PAGE  |
|---|-----------------------------------|---|---|
| <b>Bearings (Concluded)</b>                         |                                   | <b>C</b>  |   |
| Oil groove design and location                      | Fe 42                             | <b>Canadian Manufacturers' Association</b>        | Mr 22   |
| Temperature effects                                 | Ap 32; Je 30                      | <b>Carburetors and Carburetion</b>                |   |
| Future predicted                                    | Jl 23                             | Air cleaner effects                               | My 36   |
| Lubrication   |                                   | Aircraft  |   |
| Oil circulation, importance of                      | Fe 42                             | De-icing  | Fe 32   |
| Oil groove design and location                      | Fe 42                             | Ice formation                                     |   |
| Oil viscosity effects                               | Fe 42                             | Air preheating                                    | Ap 15   |
| Temperature effects                                 | Fe 42                             | Anilol used to prevent                            | Fe 32   |
| <b>Metals</b>                                       |                                   | Humidity effects                                  | Ap 15   |
| Aluminum  | Jl 24                             | Pilot relation to                                 | Ap 15   |
| Babbitt   |                                   | Precautions                                       | Ap 15   |
| History   | Fe 42                             | Prevention of                                     | Fe 32   |
| Limitations   | Fe 42                             | Testing   | Oc 20   |
| Other types compared with                           | Fe 42                             | Improvement needed                                | Ap 13, Ap 14, Ap 15                           |
| Progress  | Fe 42                             | Air-fuel mixture ratio                            |   |
| Cadmium   | Fe 42                             | Distribution relation to                          | Oc 21   |
| Copper-lead   | Fe 42; Jl 24                      | Factors affecting                                 | Oc 21   |
| Corrosion   | Jl 24                             | Choke, automatic                                  | Mr 22; Jl 41, Jl 42                           |
| Detonation effects on                               | Fe 42                             | Downdraft   | Jn 24   |
| Future predicted                                    | Jl 23                             | Engine-stalling problem                           | Mr 22   |
| Lubricant effects on                                | Fe 42                             | Fleet operation problems                          | My 36   |
| Processing, importance of                           | Fe 42                             | Fuel volatility effects                           | Jl 41   |
| Progress  | Fe 42; Se 25                      | History   | Mr 22; Ag 20                                  |
| Properties  | Jl 23                             | Jet type  |   |
| Selection, importance of                            | Jl 23, Jl 24                      | Anti-percolator                                   | Mr 22   |
| <b>Bibliofilm Service</b>                           | Je 30                             | Delivery, summer and winter variation             | Mr 22   |
| <b>Bodies</b>                                       |                                   | Problems  | Mr 22   |
| <b>AUTOMOBILE SEAT CUSHIONS AND RIDING COMFORT</b>  | Jl 26                             | Progress  | Mr 26; My 14                                  |
| Air conditioning                                    |                                   | Starting difficulties                             |   |
| Air cleaners needed                                 | De 13                             | Causes  | Mr 22   |
| Control, automatic                                  | Fe 18                             | Solution  | Mr 22   |
| Definition  | Fe 17; De 13                      | <b>Civil Aeronautics Authority</b>                | No 10   |
| Equipment   |                                   | <b>Clutches</b>                                   |   |
| Description of                                      | Fe 17, Fe 18                      | Design trends                                     | De 16   |
| Weight of   | Fe 18                             | Simplification                                    | De 16   |
| Passenger requirements                              | De 13                             | <b>Commercial Cars</b>                            |   |
| Problems  | Fe 17, Fe 18; No 23, No 24        | (See Fleet Operation, Motorcoach and Motor-Truck) |   |
| Safety factor                                       | Fe 17                             | <b>Congress of American Business</b>              | De 7  |
| Summer conditions                                   | Fe 17; De 13                      | <b>Cooperative Fuel Research</b>                  |   |
| System described                                    | Jn 31                             | American Petroleum Institute cooperation          | Oc 19   |
| Winter conditions                                   | Fe 17; De 13                      | Aviation fuels                                    | Jn 21; Mr 16                                  |
| Chassis unit construction with                      |                                   | Committee membership                              | Fe 45   |
| Advantages  | My 18; No 28                      | Committee reorganization                          | Mr 17   |
| Example of  | My 18                             | Cooperative nature of                             | De 17   |
| Future predicted                                    | My 18; No 28                      | Detonation testing                                |   |
| Problems involved                                   | My 18; No 28                      | Aviation gasoline                                 | Jl 36; Se 18                                  |
| Customer influence                                  | Ap 32                             | Engine  |   |
| Design procedure                                    | Ap 32                             | C.F.R.  | No 36   |
| Heating   | No 23                             | Cooperative Universal Single-Cylinder             | No 36   |
| Humidity control                                    | No 23                             | Knock rating                                      | Jn 21   |
| Motorcoach, air conditioning problems               | Fe 17, Fe 18                      | Laboratory  | Jn 21; Fe 37; Jl 39, Jl 40; Se 10             |
| Motor-truck   |                                   | Manufacturer cooperation invited                  | Mr 16   |
| Standardization needed                              | Je 19, Je 20                      | Motor Method                                      | Se 10   |
| Trends  | Je 20                             | Progress  | Se 19, Se 20                                  |
| Seats, cushions                                     |                                   | Road  | Jn 21; Fe 37; Jl 39, Jl 40; Se 8, Se 9, Se 10 |
| Damping characteristics                             | Jl 28                             | Fuels Survey Section                              | Jn 21   |
| Requirements  | Jl 26, Jl 27, Jl 28, Jl 29        | Heptane specification, tentative                  | Jn 20   |
| Riding qualities affected by                        | Jl 26                             | Iso-octane specification adopted                  | Jn 20   |
| Test data   | Jl 26, Jl 27, Jl 28, Jl 29        | Motor Fuels Section                               | Jn 20   |
| Types compared                                      | Jl 29                             | Motor Survey                                      | Oc 19   |
| Vibration   | Jl 28, Jl 29                      | Progress  | Fe 48; Oc 8, Oc 12; No 20                     |
| <b>Brakes</b>                                       |                                   | Summer Gasoline Survey Report, 1937               | Jn 20   |
| Fluid, development of                               | Fe 39                             | Vapor lock research                               | Jn 20, Jn 21; Mr 16, Mr 17; Jl 47; No 20      |
| Heat transmission problems                          | Je 21                             | <b>Corrosion and Corrosion Prevention</b>         |   |
| Hydraulic   | Jn 31; De 16                      | Alclad merits                                     | No 10, No 18                                  |
| Motor-truck, braking conditions, factor to evaluate | Mr 25                             | Pitting   | No 18   |
| Railcar   | No 22                             | Stainless steel merits                            | No 18   |
| <b>Bureau for Street Traffic</b>                    | My 28                             | <b>Crankshafts</b>                                |   |
| <b>Bureau of Aeronautics</b>                        | Jn 21                             | Diesel and gasoline usage compared                | My 39   |
| <b>Bureau of Air Commerce</b>                       | Ap 26                             | Hardened  |   |
| <b>Bureau of Mines</b>                              | Jn 20; Mr 18; Jl 41               | Methods of obtaining                              | My 39   |
| <b>Bureau of Public Roads</b>                       | Jn 30; Fe 25; Mr 14; My 24; De 17 | Need for  | My 39   |
| <b>Bureau of Standards</b>                          | Jn 20; Mr 14, Mr 18; My 33; De 17 | Hardness factor                                   | No 38   |
| <b>Bus</b>  |                                   | Vibration, dampeners, rubber-type                 | Jl 20   |
| (See Motorcoach)                                    |                                   | <b>Cylinders</b>                                  |   |
|   |                                   | Aircraft  |   |
|   |                                   | Lubricant type effects                            | Oc 19   |
|   |                                   | Temperature, thermocouples used to study          | Mr 22   |

## Abbreviations Used:

January, Jn  
February, Fe  
March, Mr

April, Ap  
May, My  
June, Je

## Months of the Year

July, Jl  
August, Ag  
September, Se

October, Oc  
November, No  
December, De

# S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

## Cylinders (Concluded)

|                       |       |
|-----------------------|-------|
| Hardness factor       | No 38 |
| Material, hardness of | My 39 |
| Materials used in     | No 38 |
| Testing               |       |
| Results summarized    | No 38 |
| Temperature           | Mr 22 |
| Wear                  |       |
| Causes                | Ap 22 |
| Material effects      | Ap 22 |
| Piston ring effects   | Mr 23 |
| Remedies              | Ap 22 |

## D

### Democracy

|                   |       |
|-------------------|-------|
| Engineers part in | Je 29 |
| Man-elements in   | Je 29 |

### Detonation

|  |   |
|--|---|
| Knock-Testing in the Laboratory and in Service | Jl 39; Se 7                                   |
| Accessory knock suppressers                    | Oc 18   |
| Control system                                 | Oc 18   |
| Engine factors                                 |   |
| Air-fuel mixture ratio                         | Fe 37   |
| Air-fuel mixture temperature                   | Fe 37   |
| Diesel engine                                  | Fe 34   |
| Ignition, timing                               | Mr 18   |
| Intake manifold design                         | Fe 37   |
| Spark advance                                  | Jl 39, Jl 40                                  |
| Fuel factors                                   |   |
| Cracking                                       | Ap 20   |
| Diesel fuel                                    | Fe 34   |
| Octane number                                  | Mr 18; Ap 20; Jl 39, Jl 40; Se 8, Se 9        |
| Sensitivity                                    | Jl 40   |
| Pressure data, importance of                   | Fe 37   |
| Suppressers                                    |   |
| Accessory knock                                | Oc 18   |
| Anilol   | Fe 32   |
| Tetraethyl lead                                | Jl 35, Jl 36                                  |
| Testing  |   |
| Atmospheric effects                            |   |
| Humidity                                       | Se 9  |
| Temperature                                    | Se 8, Se 9, Se 10, Se 11, Se 12, Se 19        |
| Aviation gasoline                              |   |
| Cooperative Fuel Research method               | Jl 36; Se 18                                  |
| Problem analyzed                               | Se 18, Se 19                                  |
| Reference fuels                                | Se 19   |
| Car variation effects                          | Se 9, Se 17                                   |
| Cooperative Fuel Research method               |   |
| Aviation gasoline                              | Jl 36   |
| Laboratory                                     | Jl 39, Jl 40; Se 10                           |
| Merits   | Jl 40   |
| Progress                                       | Se 19, Se 20                                  |
| Road   | Fe 37; Mr 16; Jl 39, Jl 40; Se 8, Se 9, Se 10 |
| Correlation, laboratory and road tests         |   |
| Conclusions summarized                         | Se 19, Se 20                                  |
| Data on  | Se 10   |
| Difficulties                                   | Se 10, Se 11                                  |
| Multiple-method recommended                    | Se 12, Se 17, Se 18, Se 20                    |
| Need for                                       | Se 10   |
| Problem analyzed                               | Se 10, Se 11                                  |
| Progress                                       | Se 19, Se 20                                  |
| Ratings  | Jl 39   |
| Weighting systems                              | Se 9, Se 11, Se 12                            |
| Engine factors                                 |   |
| Cylinder head design                           | Se 10   |
| Spark timing                                   | Se 9, Se 10, Se 11                            |
| Speed  | Se 10   |
| Fuel factors                                   |   |
| Air-fuel mixture ratio                         | Se 10   |
| Volatility                                     | Se 12   |
| Knock intensity effect                         | Fe 37   |
| Laboratory                                     |   |
| Purpose  | Se 9, Se 18                                   |
| Road test correlation with                     | Fe 37; Se 10, Se 11                           |
| New methods recommended                        | Jl 39   |
| Photographic method used                       | Fe 37   |
| Problems analyzed                              | Jl 39, Jl 40; Se 7                            |
| Reference fuels                                | Se 8, Se 9, Se 19                             |
| Road   |   |
| Average ratings                                | Se 8, Se 11, Se 17, Se 18                     |
| Difficulties                                   | Se 9  |
| Factors affecting                              | Se 7, Se 8, Se 9, Se 10                       |
| Laboratory test correlation with               | Fe 37; Se 10, Se 11                           |
| Purpose  | Se 9  |
| Statistical study needed                       | Se 9  |

## E

### Economics

|                                    |              |
|------------------------------------|--------------|
| Cooperation, employer and employee | Mr 21; Oc 20 |
|------------------------------------|--------------|

## Economics (Concluded)

|                                |              |
|--------------------------------|--------------|
| Employment                     |              |
| Child labor                    | De 7         |
| Data                           | Jl 30        |
| Engineer's responsibility      | No 12        |
| Human relationships            | Jl 46; De 7  |
| Industry, American             |              |
| Outlook                        | De 13        |
| Steel relation to              | De 13        |
| Industry and patriotism        | De 7         |
| Living standards               |              |
| American and foreign compared  | My 14        |
| Machine effects                | Jl 19        |
| Progress                       | Jl 19        |
| Platform for American Industry | De 7         |
| Tariff, Canadian               | Mr 22        |
| Unemployment                   |              |
| Data                           | Jl 30        |
| Technology relation to         | Jl 18, Jl 30 |
| War effects                    | De 13        |

## Electric Drive

|                              |              |
|------------------------------|--------------|
| Cost, future predicted       | De 24        |
| Diesel engine used with      | De 23        |
| Gear-box drive compared with | De 23, De 24 |
| Merits                       | De 23, De 24 |
| Motorcoach use of            | De 23        |
| Usage extent                 | De 23        |

## Engine Design and Construction

|                                     |              |
|-------------------------------------|--------------|
| American and British compared       | My 14        |
| Cooling, progress                   | Fe 54        |
| Cylinder types                      |              |
| Barrel                              |              |
| Design described                    | My 31        |
| Field for                           | My 32        |
| Merits                              | My 31        |
| Problems                            | My 31        |
| Revolver-barrel                     | My 31        |
| Future predicted                    | De 12        |
| Makes                               |              |
| Buick                               | Jn 32        |
| Cadillac                            | Jn 32        |
| Still                               | Jn 24        |
| Mounting                            |              |
| Forward vs. rear; student debate on | No 21        |
| Rubber                              | Jl 20        |
| Vibration reduction through         | Jl 20        |
| Problems                            | De 12        |
| Progress                            | Jl 23; De 16 |

(See also Bearings; Carbureters and Carburetion; Crankshafts; Cylinders; Detonation; Engine Operation and Performance; Engines, Aircraft; Engines, Diesel; Engines, Industrial; Engines, Motorcoach; Engines, Motor-Truck; Engines, Oil; Foreign Design and Operation; Fuels; Gasoline; Ignition; Induction; Pistons; and Valves and Valve-Gear)

## Engine Operation and Performance

|   |                                   |
|---|-----------------------------------|
| Compression ratio, trends               | Mr 18                             |
| Cooling                                 |                                   |
| Anti-freeze, ethylene glycol            | Fe 39                             |
| Ethylene glycol                         |                                   |
| Anti-freeze use                         | Fe 39                             |
| Cooling use                             | Fe 39                             |
| Fans, belt life                         | Jn 31                             |
| Diesel engine compared with             | Mr 25; Ap 24; My 38, My 39; No 24 |
| Fuel consumption                        |                                   |
| Air-fuel mixture ratio effects          | Jl 22                             |
| Compression ratio effects               | Jl 22                             |
| Distribution                            | Jl 22                             |
| Fuel octane number                      |                                   |
| Data on                                 | Mr 18                             |
| Requirements                            | Mr 18                             |
| Load effects                            | Jl 22                             |
| Friction                                | Jl 22                             |
| Heat transfer problems                  | Je 21                             |
| Hesselman engine compared with          | No 24                             |
| Lubricants and lubrication              |                                   |
| Blowby, oil viscosity effects           | Jl 50                             |
| Engine deposits                         | Ap 32; No 36                      |
| Fuel consumption, oil viscosity effects | Jl 50                             |
| Oil changing periods                    | Je 30                             |
| Oil consumption, trends                 | Jl 50                             |
| Oil decomposition                       | Je 30                             |
| Oil dilution                            | Je 20; Jl 50                      |
| Oil filtration                          | Je 30                             |
| Oil properties                          |                                   |
| Compound merits                         | Jl 50                             |
| Viscosity                               |                                   |
| Blowby affected by                      | Jl 50                             |

# SUBJECT INDEX

|   | PAGE                                     |   | PAGE                |
|---|--|---|---------------------|
| <b>Engine Operation and Performance (Concluded)</b>   |  | <b>Engines, Aircraft (Concluded)</b>  |                     |
| Dilution affected by  | Jl 50                                    | Flight testing  | Mr 22               |
| Fuel consumption affected by  | Jl 50                                    | Plane and engine testing compared   | Mr 22               |
| High vs. low  | Jl 50                                    | Time required   | Mr 22               |
| Low vs. high  | Jl 50                                    | Future predicted  | Jn 24; Ag 26; De 12 |
| Sludge formation affected by  | Jl 50                                    | Improvements needed   | Jn 24               |
| Oil reclamation   | Je 30                                    | Inspection forms revised  | Je 21               |
| Sludge formation  |  | Installation problems   | Fe 31, Fe 55        |
| Composition   | Ap 32; No 36                             | Light airplane requirements   | Ap 28; Oc 20        |
| Effects of  | No 36                                    | Lubricants and lubrication  |                     |
| Reduction means   | Ap 32                                    | Compound, use of  | Fe 36               |
| Variation in  | No 36                                    | Difficulties  | Jl 36, Jl 37        |
| Viscosity effects   | Jl 50                                    | Lubricant requirements  | Jl 36, Jl 37        |
| Mileage, tank   | Jl 22                                    | Research  | Fe 36, Fe 37        |
| Noise   |  | Research committee formed   | Mr 18               |
| Reduction progress  | De 14                                    | Wear affected by  | Oc 19               |
| Wind-rustle effects   | De 14                                    | Maintenance, replacement period   | Jl 32               |
| Oil engine compared with  | No 24                                    | Makes, Continental  | Oc 20               |
| Operating efficiency, instrumentation to measure  |  | Power   |                     |
| Cost factor   | De 24                                    | Accessory effects   |                     |
| Need for  | De 24                                    | Improvements suggested  | Fe 31               |
| Power, pressure data, importance of   | Fe 37                                    | Problems connected with   | Fe 30, Fe 31        |
| Roughness, pressure data, importance of   | Fe 37                                    | Trends  | Fe 54               |
| Tank mileage  | Jl 22                                    | Problems  | De 12               |
| Testing, combustion, photographic method used   | Fe 37                                    | Progress  | Fe 54               |
| Throttling  | Jl 22, Jl 23                             | Rotary valve merits   | Jn 24               |
| Tune-up   |  | Size  |                     |
| Importance  | Jn 34; My 32; Je 20, Je 36; No 11        | Propeller effects   | Ap 27               |
| Objective   | Oc 20                                    | Trends  | Jl 30               |
| Problems  | Jn 34                                    | Sleeve valve  |                     |
| Wear points named   | Oc 21                                    | Compression ratio affected by   | Jn 24               |
| Vapor lock research   | Jn 20, Jn 21; Mr 16, Mr 17; Jl 47; No 20 | Engine size relation to   | Jl 35               |
| Vibration   |  | Fuel consumption affected by  | Jn 24               |
| Mounting effects  | Jl 20                                    | In-line engine use of   | Jl 34, Jl 35        |
| Reduction means   | Jl 20                                    | Merits  | Jl 33, Jl 34, Jl 35 |
| Wear, surface finish relation to  | My 38                                    | Radial engine use of  | Jl 35               |
| (See also Carbureters and Carburetion; Crankshafts; Cylinders; Detonation; Engine Design and Construction; Engines, Aircraft; Engines, Diesel; Engines, Motorcoach; Engines, Motor-Truck; Engines, Oil; Foreign Design and Operation; Fuels; Gasoline; Ignition; Induction; Oil Filters; Pistons; Supercharging; and Valves and Valve Gear) |  | Testing, flight   | Mr 22               |
|   |  | Vibration   |                     |
|   |  | Causes  | Ap 14               |
|   |  | Elimination, progress in  | Fe 32               |
|   |  | Wear  |                     |
|   |  | Definition of   | Fe 37               |
|   |  | Lubricant effects   | Oc 19               |
|   |  | (See also Carbureters and Carburetion; Crankshafts; Cylinders; Detonation; Fuels; Gasoline; Ignition; Induction; Pistons; Supercharging; and Valves and Valve Gear) |                     |
| <b>Engineers and Engineering</b>  |  | <b>Engines, Diesel</b>  |                     |
| Classification  | Jn 24                                    | Automotive possibilities  | Jl 38               |
| Cooperative effort  | Fe 13                                    | Automotive requirements   | Oc 22               |
| Education   | Mr 24                                    | Combustion, supercharging effects   | Mr 25               |
| Engineer and scientist compared   | Se 15                                    | Design described  | Ap 24               |
| Opportunity for   | Fe 15                                    | Development   | Ap 24               |
| Scientist and engineer compared   | Se 15                                    | Disadvantages   | No 24               |
| Value of  | Jl 19                                    | Drive, gear-box and electric compared   | De 23, De 24        |
|   |  | Electric drive used with  | De 23               |
| <b>Engines, Aircraft</b>  |  | Foreign   |                     |
| Accessories   |  | Data on   | Jl 37               |
| Future predicted  | No 20                                    | Usage extent  | Jl 37               |
| Increase in   | Fe 30                                    | Four vs. two-stroke cycle   | Fe 34, Fe 35        |
| Power affected by   | Fe 30                                    | Fuel consumption  |                     |
| Types of  | No 20                                    | Data on   | Ap 24               |
| Auxiliary engine  |  | Gasoline engine compared with   | Ap 24               |
| Factors affecting   | Fe 31                                    | Progress  | Oc 22               |
| Types of  | Fe 31                                    | Fuel deposition   |                     |
| Cooling   |  | Altitude effects  | Fe 34               |
| Air   |  | Cetane number effects   | Fe 34               |
| Baffle pressure drop  | Jl 36                                    | Engine design effects   | Fe 34               |
| Cowl design effects   | Jl 36                                    | Fuel type effects   | Fe 34               |
| Engine types compared, in-line vs. radial   | Jl 36                                    | Load effects  | Fe 34               |
| Fins  | Jl 36                                    | Temperature effects   | Fe 34               |
| Heat transfer rate, improvement of  | Jl 36                                    | Test results  | Fe 34               |
| Problems  | Jl 36                                    | Volatility effects  | Fe 34               |
| Steam   | Jn 24                                    | Fuel feeding  |                     |
| Cowling   |  | Air injection   |                     |
| Aircraft speed affected by  | Jl 30                                    | Disadvantages   | Mr 25               |
| Cooling affected by   | Jl 36                                    | Solid injection compared with   | Mr 25               |
| Exit-slot location  | Jl 36                                    | Improvements needed   | Jl 38, Jl 39        |
| Cylinder types  |  | Injector described  | Ap 24               |
| In-line, vibration in   | Ap 14, Ap 15                             | Manufacturing problems  | Mr 23               |
| Radial, vibration in  | Ap 14, Ap 15                             | Nozzles   |                     |
| Diesel  |  | Clearances  | Mr 23               |
| Barrel-type   | Fe 35                                    | Pressure  | Mr 23               |
| Four vs. two-stroke cycle   | Fe 34, Fe 35                             | Pressures in  | Jl 38               |
| Gasoline engine compared with   | Fe 31, Fe 34                             | Pump drives and mountings   | Mr 23; Oc 21        |
| Makes, Junkers  | Fe 34                                    | Solid injection   |                     |
| Merits  | Jn 24; Fe 34; Mr 21                      | Air injection compared with   | Mr 25               |
| Safety factor   | Fe 34                                    | Merits  | Mr 25               |
| Scavenging  | Fe 34                                    | Unit injector   | Ap 24; Jl 38, Jl 39 |
| Two-cycle   |  |   |                     |
| Data on   | Jl 38                                    |   |                     |
| Four-stroke cycle compared with   | Fe 34, Fe 35                             |   |                     |

|  | PAGE   |  | PAGE  |
|--|--|--|---|
| <b>Engines, Diesel (Concluded)</b>   |  | <b>Engines, Railcar</b>                      |   |
| Fuel utilization, factors affecting  | Fe 54  | Diesel                                       |   |
| Future predicted   | Mr 25  | Cost factor                                  | No 12; No 22                                    |
| Gasoline engine compared with  | Jn 33; Fe 31, Fe 34, Fe 53; Mr 25; My 38, My 39; No 24; De 12, De 24 | Future predicted                             | No 12   |
| Hesselman engine compared with   | No 24  | Maintenance methods                          | Jn 22   |
| History  | Mr 25; Jl 38   | Merits                                       | No 11, No 12, No 22                             |
| Lubricants and lubrication   |  | Problems                                     | No 12   |
| Compound merits  | Jl 38  | Progress                                     | No 12   |
| Improvements   | Jl 38  | Steam engine compared with                   | No 11, No 12, No 22                             |
| Oil filtration   | Je 30  | Two-cycle                                    | No 11, No 22                                    |
| Makes  |  | Weight factor                                | No 12   |
| Comet  | Fe 53  | Future predicted                             | No 12   |
| General Motors   | Ap 24; Jl 38, Jl 39; De 24   | Makes  |   |
| Hercules   | Oc 22  | Electro-Motive                               | No 22   |
| Junkers  | Jl 37, Jl 38   | Winton                                       | No 11   |
| Oberhansli   | Jl 38  | Progress                                     | No 11   |
| Saurer   | Jl 37  | Steam, Diesel engine compared with           | No 12   |
| Merits   | Mr 25; No 21, No 24  | <b>Engines, Tractor</b>                      |   |
| Motor-truck usage  | Jn 22, Jn 30, 32   | Lubrication, wear relation to                | No 38   |
| Operating requirements   | Jn 22, Jn 30, Jn 33  | Testing, "dust-house"                        | My 39; No 38                                    |
| Oil-country usage  | Fe 53  | Wear   |   |
| Progress   | Fe 34; Mr 25; Ap 24; Oc 22   | Diesel and gasoline compared                 | My 38   |
| Railroad usage   | Jn 22; No 11   | Dust effects                                 | My 39   |
| Sales, increase in   | Oc 22  | Dust-house testing                           | No 38   |
| Scavenging   | Ap 24  | Factors affecting                            | My 38, My 39; No 38                             |
| Steam engine compared with   | No 11  | Gasoline and Diesel compared                 | My 38   |
| Supercharging effects  | Fe 35  | Lubrication relation to                      | My 38; No 38                                    |
| Trends   | My 36  | Reduction means                              | My 38, My 39                                    |
| Two-cycle  |  | Surface finish relation to                   | My 38   |
| Blower design effects  | Jl 38  |  |   |
| Cooling  | Jl 38  | <b>Finishes</b>                              |   |
| Four-cycle compared with   | Fe 34, Fe 35; Jl 38  | Progress                                     | Jn 16   |
| Gasoline engine compared with  | Jl 38  | Synthetic-resin enamels                      |   |
| Scavenging   | Jl 38  | Composition                                  | Jn 16   |
| (See also Cylinders; Detonation; Engines, Aircraft; Engines, Motor-coach; Engines, Motor-Truck; Fuels; Pistons; and Supercharging) |  | Merits                                       | Jn 16   |
|  |  | Other types compared with                    | Jn 16   |
|  |  | Servicing of                                 | Jn 16   |
| <b>Engines, Industrial</b>   |  | <b>Fleet Operation</b>                       |   |
| Cost factor  | No 20  | Army experience                              | De 12, De 22                                    |
| Multi-cylinder, merits of  | No 20  | Carburetor problems                          | My 36   |
| Oil field use  |  | Cost   |   |
| Design requirements  | No 20, No 21   | Data   | No 20; De 11                                    |
| Problems   | No 21  | Diesel and gasoline engines compared         | De 12   |
| <b>Engines, Motorcoach</b>   |  | Engine tune-up effects                       | Fe 56   |
| Diesel   |  | Factors affecting                            | Oc 10   |
| Electric drive used with   | De 23  | Parts manufacturer's relation to             | De 23   |
| Fuel consumption   |  | Reduction means                              | De 11   |
| Data on  | Ap 24  | Cost-control-system merits                   | De 22   |
| Gasoline engine compared with  | Ap 24  | Depreciation                                 |   |
| Fuel economy   | Ap 24  | Factors involved                             | De 22, De 23                                    |
| Drive, gear-box and electric compared  | De 23, De 24   | Fleet superintendent's relation to           | De 23   |
| Electric drive merits  | De 23  | Milk industry                                | De 23   |
| <b>Engines, Motor-Truck</b>  |  | Reserve fund                                 | De 22   |
| Brake mean effective pressure  | De 10  | Driver responsibility                        | De 11   |
| Design fundamentals  | De 10  | Engineering importance                       | Ap 32   |
| Diesel   |  | Engine tune-up effects                       | Fe 56   |
| Cold weather operation   | Jn 53  | Factors involved                             | Ap 32; De 11                                    |
| Fuel consumption   |  | Lubrication                                  |   |
| Data on  | Ap 24  | Importance of                                | Mr 23   |
| Gasoline engine compared with  | Ap 24  | Oil changing period                          | Mr 23   |
| Fuel economy   | Ap 24  | Oil reclamation                              | Mr 23   |
| Gasoline engine compared with  | Jn 33; De 12   | Maintenance                                  |   |
| Operating requirements   | Jn 22, Jn 30, Jn 33  | Army experience                              | De 12, De 22                                    |
| Distortion, reduction of   | De 10  | Cost   | Fe 28, Fe 56; Oc 10; No 20; De 11, De 12, De 23 |
| Lubrication  |  | Criticism                                    | Jl 32   |
| Deposits   |  | Engine tune-up effects                       | Fe 56   |
| Causes   | Je 20  | Equipment and methods                        | Je 36   |
| Emulsion trouble   | Je 20  | Factors involved                             | Oc 18   |
| Remedies   | Je 20  | Failure, premature, defined                  | Fe 27   |
| Oil dilution   | Je 20  | Importance of                                | Jn 35; Mr 25; Jl 32                             |
| Operating efficiency, instrumentation to measure   |  | Inspection                                   | Fe 28; Oc 18                                    |
| Cost factor  | De 24  | Lubrication, importance of                   | Fe 28   |
| Need for   | De 24  | Manufacturer and operator cooperation needed | Fe 27, Fe 28                                    |
| Tune-up  |  | Methods and equipment                        | De 14   |
| Importance of  | Je 20, Je 36   | Mixed vehicles                               | Oc 18   |
| Merits   | No 11  | Motor tune-up merits                         | No 11   |
| Periodical   | Je 36  | Operator and manufacturer cooperation needed | Fe 27, Fe 28                                    |
| Procedure  | Je 36  | Preventive                                   | Fe 28; Mr 25; Oc 18; De 11, De 14               |
| <b>Engines, Oil</b>  |  | Records, importance of                       | Fe 26, Fe 27, Fe 28; De 11                      |
| Definition of  | Fe 53  | Tire problems                                | Fe 29, Fe 30                                    |
| Diesel engine compared with  | No 24  | Tire retreading                              | Fe 26, Fe 30                                    |
| Disadvantages  | No 24  | Traveling inspectors                         | Fe 28   |
| Gasoline engine compared with  | Fe 53; No 24   | Unit maintenance merits                      | De 14   |
| Makes, Hesselman   | Fe 53; No 24   | Management problems                          | Je 36   |
| Merits   | No 24  | Mileage                                      | De 14   |
|  |  | Obsolescence                                 | De 23   |



## SUBJECT INDEX

### Abbreviations Used:

|              |           |               |              |
|--------------|-----------|---------------|--------------|
| January, Jn  | April, Ap | July, Jl      | October, Oc  |
| February, Fe | May, My   | August, Ag    | November, No |
| March, Mr    | June, Je  | September, Se | December, De |

# S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

|   | PAGE                       |   | PAGE                |
|---|----------------------------|---|---------------------|
| <b>Generators</b>                                     |                            | <b>Lighting</b>   |                     |
| Motor-truck problems                                  | Jl 40, Jl 41               | Failure causes  | Jn 34               |
| <b>Golden Gate Exposition</b>                         | De 18                      | Wiring effects  | Jn 34               |
|   |                            | (See also Headlighting)   |                     |
| <b>H</b>  |                            | <b>Lubricants and Lubrication</b>   |                     |
| <b>Headlighting</b>                                   |                            | Classification  | Mr 18               |
| Factors affecting                                     | Je 30                      | Compound  |                     |
| Glare problems  | Jn 33                      | Corrosion factor  | Jl 38               |
| Headlamp adjustment                                   | Je 30                      | Diesel engine use of  | Jl 38; No 36        |
| Standardization                                       | Mr 16                      | Effects of  | No 36               |
| (See also Lighting)                                   |                            | Engine, aircraft, use of  | Fe 36; Oc 19        |
| <b>Heat Treatment</b>                                 |                            | Future predicted  | Ap 24; No 36        |
| Problems  | Fe 42                      | Merits  | Jl 38               |
| Progress  | Fe 32                      | Physical properties   | Ap 24; Jl 38        |
| Solid solution, explanation of                        | Fe 39                      | Soap-type   | Jl 38               |
| <b>Highways</b>                                       |                            | Uses of   | Oc 19               |
| (See Roads and Streets)                               |                            | Wear decreased by   | Oc 19               |
| <b>I</b>  |                            | Extreme-pressure  |                     |
| <b>Ignition</b>                                       |                            | Evaluation of   | Jn 35               |
| Dual system   | Fe 31                      | Hypoid lubricant requirements   | Fe 36               |
| Progress  | De 14                      | Rear axle use   | Fe 36               |
| Spark plugs   |                            | Research needed   | Fe 36               |
| Aircraft  |                            | Seizure delay   | No 21               |
| Design requirements                                   | Fe 31                      | Situation analyzed  | Oc 19               |
| Improvements analyzed                                 | Oc 18                      | Temperature importance  | No 21               |
| Maintenance cost                                      | Jl 32                      | Testing, load carrying capacity   |                     |
| Testing   | Fe 31                      | Machines for  | No 21               |
| Tractor   | My 39; No 38               | Four Ball   | No 21               |
| <b>Induction</b>                                      |                            | Royal Dutch Shell   | Fe 36; Mr 16; My 27 |
| Distribution  |                            | S.A.E. Research type  | Fe 36               |
| Air-fuel mixture ratio variation                      | Fe 37                      | Test results  |                     |
| Problems  | Fe 37                      | Frictional surfaces, chemical treatment of  |                     |
| Testing   | Fe 37                      | Feritex   | Jl 38               |
| Manifolds   |                            | Merits  | Jl 38               |
| Iso-thermal   | Jn 30                      | Future predicted  | Ap 24; No 36        |
| Progress  | Jn 30                      | Hypoid lubricants, progress   | Fe 53               |
| <b>Institute of the Aeronautical Sciences</b>         | De 16                      | Lubricant requirements, aircraft engine   | Jl 36, Jl 37        |
| <b>Institution of Automotive Engineers, Australia</b> |                            | Lubricant tester, Faville-LeVally   | Jl 38               |
| Meeting, S.A.E. delegate to                           | Fe 42, Ap 31               | Oil changing periods  | Je 30; De 13        |
| S.A.E. cooperation                                    | Fe 42, Ap 31               | Oil filter effects  | Mr 23               |
| <b>Institution of Automobile Engineers</b>            | Jn 37                      | Oil properties desirable  | Ap 24; No 36        |
| <b>Institution of Mechanical Engineers</b>            | My 27                      | Oil reclamation   | Mr 23               |
| <b>Instruments</b>                                    |                            | Oil selection   |                     |
| Accelerometer, Chrysler Integrating                   | Jl 29                      | Factors affecting   | Jn 40; My 38        |
| Aircraft  |                            | Importance of   | Jn 40               |
| Dubl-Chek instrument board                            | No 20                      | Oil types   |                     |
| Indicator, visual trim-angle, N.A.C.A.                | Ag 9                       | Compound  | Ap 24               |
| Landing, automatic                                    | Je 16, Je 17               | Mineral   | Ap 24               |
| Camera, high-speed motion                             | Fe 37                      | Oiliness testing  | Jl 38               |
| Combustion chamber measurement                        | Jl 32                      | Requirements analyzed   | Ap 24               |
| Crankcase oil analyzer                                | Jn 34                      | Sludge formation  | Ap 32               |
| Decelerometer   | Jl 32                      | Testing, oiliness   | Jl 38               |
| Profilometer  | My 38; No 18, No 20; De 12 | Viscosity   |                     |
| Psychrometer  | Oc 20                      | Engine operation affected by  | Jl 42, Jl 50        |
| Riding-comfort, exhibition of                         | Mr 16; Jl 21, Jl 23        | Lower   |                     |
| Rotameter   | No 20                      | Advantages  | Jl 42               |
| Synchrograph  | Jn 34                      | Disadvantages   | Jl 42               |
| Voltage regulator                                     | Jn 34                      | Problems connected with   | Jl 42, Jl 50        |
| <b>International Management Congress</b>              | My 29                      | Oil decomposition effects   | Je 30               |
| <b>International Standards Association</b>            | Jn 20; Ag 16; De 18        | Pressure effects  | Ap 24               |
| <b>Interstate Commerce Commission</b>                 | Jn 20, Jn 21; Fe 25; De 23 | Trends  | De 13               |
| <b>Inventions</b>                                     | My 30                      | Wedge lubrication   | My 36               |
| <b>K</b>  |                            | (See also Automobile Operation and Performance; Axles; Engine Design and Construction; Engine Operation and Performance; Engines, Aircraft; Engines, Diesel; Engines, Motor-Truck; Engines, Tractor; Fleet Operation; Gears; Motor-Truck Operation and Performance; Oil Filters; and Transmissions) |                     |
| <b>Knock</b>  |                            | <b>M</b>  |                     |
| (See Detonation)                                      |                            | <b>Massachusetts Institute of Technology</b>  | Ap 26               |
| <b>L</b>  |                            | <b>Materials</b>  |                     |
| <b>Legislation</b>                                    |                            | Carbon black, applications of   | Fe 39               |
| Accident prevention                                   | Jn 20; Oc 12; De 18        | Glass   |                     |
| Engineers' interest in                                | Ap 32                      | Safety  |                     |
| Inspection program                                    | Oc 12                      | Interstate Commerce Commission hearings   | Jn 20               |
| Interstate Commerce Commission                        | Jn 20, Jn 21               | Standard code for   | Jn 20               |
| Motor-truck   |                            | Plastics  |                     |
| Grade climbing ability                                | Ap 21, Ap 33               | Aircraft propeller use of   | Ap 27               |
| Legal Performance Requirement                         | Ap 21                      | Aircraft use of   | Fe 55               |
| Problems  | Ap 21, Ap 33               | Lucite  |                     |
| Trends  | Ap 21; My 30               | Properties  | De 13               |
| Regulation, S.A.E. relation to                        | De 18                      | Uses  | De 13               |
| Taxation, fuel  | Ap 21                      | Properties of   | De 13               |
|   |                            | Synthetic rubber  | De 12, De 13        |
|   |                            | (See also Metals and Rubber)  |                     |

# SUBJECT INDEX

|   | PAGE                       |
|---|----------------------------|
| <b>Mellon Institute of Industrial Research</b>  | Jn 30; Fe 38, Fe 39        |
| <b>Metals</b>   |                            |
| Degreasing of   | Fe 39                      |
| Ferrox  | My 36                      |
| Magnaflux testing   | My 36                      |
| Magnesium, aircraft propeller use of  | Ap 26                      |
| Metallurgy defined  | Fe 39                      |
| Test methods, magnetic  | My 35, My 36               |
| Zinc die castings   | Je 28                      |
| (See also Aluminum and Aluminum Alloys; Bearings; Corrosion and Corrosion Prevention; and Steels)   |                            |
| <b>Motor</b>  |                            |
| (See Engine)  |                            |
| <b>Motor Coach Design and Construction</b>  |                            |
| Air conditioning  | No 23, No 24               |
| Stress concentrations   |                            |
| Factors affecting   | Mr 22                      |
| Loads, impact and static, compared  | Mr 22                      |
| Weight  |                            |
| Fuel consumption affected by  | Jn 35                      |
| Progress  | Jn 22, Jn 32               |
| (See also Bodies; Engines, Motorcoach; Motorcoach Operation and Performance; and Transmissions)   |                            |
| <b>Motorcoach Operation and Performance</b>   |                            |
| Air conditioning  | No 23, No 24               |
| Cost-control-system merits  | De 22                      |
| Cost, lubrication relation to   | Mr 23                      |
| Factors affecting   | Jn 23                      |
| Lubrication   |                            |
| Costs affected by   | Mr 23                      |
| Lubricant types required  | Jl 42, Jl 50               |
| Oil filter effects  | Mr 23                      |
| Problems  | Jl 50                      |
| Maintenance   |                            |
| Design effects  | Jn 35                      |
| Equipment and methods   | Jn 23                      |
| Inspection  | Mr 23                      |
| Lubrication effects   | Mr 23                      |
| Methods and equipment   | Jn 23                      |
| Mileage   | Mr 23                      |
| Vehicle selection   | Jn 35                      |
| (See also Bodies; Engines, Motorcoach; Fleet Operation; Motorcoach Design and Construction; Riding Qualities; and Transmissions)  |                            |
| <b>Motor-Truck Design and Construction</b>  |                            |
| Accessories devised by operators  | De 25                      |
| Cab-over-engine type  |                            |
| Discontinuance and revival, reasons for   | Jn 24                      |
| Door location   | Jn 35                      |
| Driver location   | Jn 35                      |
| Increased use of  | Ap 21                      |
| Merits  | Jn 24, Jn 30, Jn 35; Fe 56 |
| Camel-back type   | Jn 35                      |
| Engine-under-seat type  | Jn 35                      |
| Loading space, redesign to increase   | Jn 24, Jn 30               |
| Stress concentrations   |                            |
| Factors affecting   | Mr 22                      |
| Loads, impact and static, compared  | Mr 22                      |
| Trends  | Mr 25                      |
| (See also Axles; Bodies; Brakes; Engines, Motor-Truck; Legislation; Motor-Truck Operation and Performance; Six-Wheel Vehicles; Springs, Suspension; Tires; and Transmissions) |                            |
| <b>Motor-Truck Operation and Performance</b>  |                            |
| Accessories devised by operators  | De 25                      |
| Cost  |                            |
| Items included  | No 25                      |
| Purchase price relation to  | No 25                      |
| Design effects, designers vs. "builders"  | Jn 34                      |
| Design factors, cab-over-engine effects   | Jn 24, Jn 30               |
| Eastern and Pacific Coast practice compared   | Jn 22, Jn 34               |
| Electrical equipment, maintenance affected by   | Jl 40                      |
| Grade climbing ability  |                            |
| Testing, plans for  | Fe 26                      |
| Test results  | Fe 25, Fe 26               |
| Inspection, State program of  | Oc 12                      |
| Lubrication   |                            |
| Lubricant types required  | Jl 42, Jl 50               |
| Problems  | Jl 50                      |
| Maintenance   |                            |
| Cleanliness   | No 25                      |
| Cost  | Fe 28; No 25               |
| Design effects  | No 25                      |
| Diesel engine problems  | Jn 30, Jn 33               |
| Driver responsibility   | No 25                      |
| Electrical equipment effects  | Jl 40                      |

|   | PAGE                       |
|---|----------------------------|
| <b>Motor-Truck Operation and Performance (Concluded)</b>  |                            |
| Equipment and methods   | Je 36                      |
| Failure, premature, defined   | Fe 27                      |
| Inspection  | Fe 28                      |
| Lubrication, importance of  | Fe 28                      |
| Manufacturer and operator cooperation needed  | Fe 27, Fe 28               |
| Preventive  | Fe 28; De 24               |
| Records, importance of  | Fe 26, Fe 27, Fe 28        |
| State highway department problems   | Jn 23                      |
| Tire problems   | Fe 29, Fe 30               |
| Tire retreading   | Fe 26, Fe 30               |
| Traveling inspectors  | Fe 28                      |
| Overloading, Eastern and Pacific Coast practice compared  | Jn 22, Jn 34               |
| <b>Performance</b>  |                            |
| Instrumentation to measure  |                            |
| Cost factor   | De 24                      |
| Need for  | De 24                      |
| Legislative effects   | My 30                      |
| Rating formula requirements   | My 30                      |
| <b>Rating</b>   |                            |
| Formula, requirements of  | My 30                      |
| Formula vs. observed rating   | Je 26                      |
| Grade climbing ability  | Fe 26                      |
| Object of   | Jn 35                      |
| Observed rating vs. formula   | Fe 26                      |
| Snow removal  | Jn 23                      |
| Testing, plans for  | Fe 26                      |
| <b>Tires</b>  |                            |
| Balloon vs. high-pressure   | Je 20                      |
| Mud-and-snow type, field for  | Je 20                      |
| Vehicle selection   | Je 20                      |
| West Coast problems   | My 37                      |
| (See also Accidents and Accident Prevention; Axles; Bodies; Brakes; Engines, Motor-Truck; Fleet Operation; Legislation; Springs, Suspension; Motor-Truck Design and Construction; Riding-Qualities; Six-Wheel Vehicles; Tires; and Transmissions) |                            |
| <b>N</b>  |                            |
| <b>National Advisory Committee for Aeronautics</b>  | Fe 34, Fe 35; My 27; Ag 0  |
| <b>National Association of Engine and Boat Manufacturers</b>  | Ag 16                      |
| <b>National Association of Manufacturers</b>  | De 7                       |
| <b>National Better Business Bureau</b>  | Je 31                      |
| <b>National Conference on Street and Highway Safety</b>   | Jn 30                      |
| <b>National Defense</b>   |                            |
| Aircraft plans  | De 13                      |
| Cost data   |                            |
| Foreign   | Jl 31                      |
| United States   | Jl 31                      |
| Object stated   | De 13                      |
| Preparation effects   | Jl 31                      |
| <b>National Electric Manufacturers Association</b>  | Jn 15                      |
| <b>National Motor Truck Show</b>  | Ag 21                      |
| <b>National Safety Council</b>  | My 40                      |
| <b>Navy</b>   |                            |
| Aircraft  |                            |
| Maintenance, design effects   | Fe 56                      |
| Overhaul problems   | Fe 56                      |
| Standards, aircraft overhaul relation to  | Fe 56                      |
| <b>New York World's Fair</b>  | De 18                      |
| <b>Noise</b>  |                            |
| Driver affected by  | De 14                      |
| Physiological effects   | De 14                      |
| <b>O</b>  |                            |
| <b>Oil</b>  |                            |
| (See Lubricants and Lubrication)  |                            |
| <b>Oil Filters</b>  |                            |
| Cost factor   | Mr 23                      |
| Flow rate   | My 30                      |
| Function  | My 31; Je 30               |
| Limitations   | De 13                      |
| Replacement units   | Mr 23                      |
| Selection of  | My 30; No 36               |
| Standard test needed  | Mr 23                      |
| Test procedure  | My 31                      |
| Test results  | No 36, No 38               |
| Types of  | Mr 23; Je 30; No 36, No 38 |
| <b>Omnibus</b>  |                            |
| (See Motorcoach)  |                            |

# S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

|   | PAGE                |  | PAGE  |
|---|---------------------|--|---|
| <b>P</b>                                  |                     | <b>Production (Concluded)</b>                                      |   |
| <b>Passenger Car</b>                      |                     | Operations involved  | Se 24   |
| (See Automobile)                          |                     | Grinding, wheel selection  | Jn 25   |
| <b>Petroleum Industry</b>                 |                     | Hardening  |   |
| Research                                  | Fe 39               | Doppl-Duro method  | My 39   |
| Science of Petroleum; Book Review         | Je 31               | Electric-induction heating method                                  | No 38   |
| <b>Pistons</b>                            |                     | Methods of   | My 39   |
| Aircraft, lubricant type effects          | Oc 19               | Tocco process  | No 24   |
| Cadmium plating                           | Jn 14               | Inspection   |   |
| Cast-steel                                |                     | Magnaflux  |   |
| Molding                                   | Jn 14               | Caution regarding  | No 19   |
| Production                                | Jn 14               | Field for  | No 19   |
| Clearance, wear affected by               | Ap 22               | Merits   | No 19   |
| Diesel                                    |                     | Progress   | No 19   |
| Misalignment effects                      | Ap 22               | X-ray  | No 19   |
| Rings                                     | Ap 21, Ap 22        | Living standards affected by                                       | Fe 33   |
| Trouble causes                            | Ap 24               | Machine tools, unit-type, merits                                   | Fe 32   |
| Wear                                      | Ap 22               | Magnaflux inspection   | No 18, No 19                                    |
| Production                                | Se 24               | Metallurgy defined   | Fe 39   |
| Progress                                  | Jn 14               | Pistons  |   |
| Rings                                     |                     | Casting  | Se 24   |
| Blowby                                    |                     | Machining  | Se 24   |
| Effects                                   | Ap 21               | Procurement planning   |   |
| Remedies suggested                        | Ap 21, Ap 23        | Army Air Corps system  | Fe 55   |
| Cylinder wear affected by                 | Mr 23               | Definition of  | Fe 55   |
| Materials used in                         | No 28               | Progress   | Fe 32   |
| Scuffing reduction                        | Ap 22, Ap 23        | Router equipment, aluminum alloy                                   | No 19   |
| Sealing type                              |                     | Screws, self-tapping   |   |
| Field for                                 | Ap 21; No 36        | Cost factor  | Fe 33, Fe 34                                    |
| Merits                                    | Ap 21; No 36        | Future predicted   | Fe 33; Oc 19                                    |
| Oil pumping increased by                  | Ap 21; No 36        | Merits   | Fe 33; Oc 19                                    |
| Sticking, definition of                   | Mr 16               | Ordinary type compared with  | Fe 33   |
| Surface structure                         | Mr 23               | Rivets compared with   | Fe 33, Fe 34                                    |
| Surfacing by Ferrox process               | Fe 36               | Sizes used   | Fe 33   |
| Wear                                      |                     | Splines  |   |
| Factors affecting                         | Ap 21, Ap 22        | Cutting  | Jn 25   |
| Gas pressure effects                      | Ap 21               | Finish   | Jn 25   |
| Lubrication effects                       | Ap 21; Oc 19        | Surface finish   | My 38; No 18; De 12                             |
| Material effects                          | Ap 22               | Transmissions  | Jn 25; Se 24                                    |
| Reduction means                           | Mr 23               | (See also Aircraft Design and Construction, Production; Automobile |   |
| Ring surface effects                      | Mr 23               | Design and Construction, Production; Corrosion and Cor-            |   |
| Tinplating effects                        | Ap 22               | rosion Prevention; Cylinders; Finishes; Gears; and Welding)        |   |
| Scoring reduction                         | Ap 23               |  |   |
| <b>Port of New York Authority</b>         | Mr 25               | <b>R</b>   |   |
| <b>Production</b>                         |                     | <b>Radio Manufacturers Association</b>                             | De 17   |
| Aircraft                                  |                     | <b>Railcars</b>  |   |
| Cost reduction                            | No 19               | Air conditioning   |   |
| Data on                                   | No 10               | Accessibility  | No 23   |
| European equipment                        | Fe 56               | Factors involved   | No 23, No 24                                    |
| Inspection, magnaflux                     | No 18, No 19        | Preventive maintenance   | No 23   |
| Problems                                  | Fe 56               | Braking problems   | No 22   |
| Quantity production relation to           | Fe 56               | "City of San Francisco"  | Jn 22   |
| Surface finish                            |                     | Heating  | No 23   |
| Measurement, importance of                | No 18               | Humidity control   | No 23   |
| Profilometer used to measure              | No 18               | Improvements recommended   | No 22   |
| Automatic transmission machining problems | Jn 25               | Maintenance methods  | Jn 22   |
| Broaching, progress                       | Fe 32               | Materials used   | No 22   |
| Car cost control                          | My 17               | Mileage  | No 11, No 22                                    |
| Climb-hobbing                             |                     | Progress   | No 11   |
| Conventional method compared with         | Jn 25               | Speed  | No 11   |
| Merits                                    | Jn 25               | Streamliners   | Jn 22; Ap 21; My 35; Je 36; No 11, No 22, No 28 |
| Control factors                           | Fe 55               | Weight reduction   | No 22   |
| Cooperation, engineering and production   | Jn 13               | <b>Railroads</b>   |   |
| Coordination, importance of               | In 16; Fe 32        | (See Transportation)   |   |
| Cost reduction                            | No 19               | <b>Refrigerators</b>   |   |
| Design coordination with                  | No 19               | Makes, Frigidaire  | Jn 32   |
| Design relation to                        | No 18               | Metallurgical development effects                                  | Jn 32   |
| Die casting                               | Je 28               | Precision manufacturing effects                                    | Jn 32   |
| Drop hammer merits                        | Fe 55               | <b>Research</b>  |   |
| Engine, Diesel, fuel injectors            | Mr 23               | Automotive industry indebted to                                    | Ap 33   |
| Finish                                    |                     | Automotive subjects studied  | De 22   |
| Honing                                    | My 38               | Color  | Mr 24   |
| Measurement of                            | No 18               | Future topics for  | Ap 33   |
| Profilometer used to measure              | No 18; De 12        | Industry served by   | Fe 38   |
| Progress                                  | No 18               | Mellon Institute investigations                                    |   |
| Superfinish defined                       | De 12               | Aluminum, chrome plated  | Fe 39   |
| Wear affected by                          | My 38               | Anti-freeze  | Fe 38   |
| <b>Forging</b>                            |                     | Brake fluids   | Fe 39   |
| Drop                                      |                     | Carbon black   | Fe 39   |
| British contribution to                   | Jn 14; Se 24        | Engine cooling   | Fe 39   |
| Flow lines                                | Jn 14, Jn 15; Se 24 | Metals, degreasing of  | Fe 39   |
| Requirements of                           | Jn 14, Jn 15; Se 24 | Petroleum  | Fe 39   |
| Temperature control                       | Jn 15               | Noise  | De 14   |
| History                                   | Se 24               | Pressure   |   |
| Gears                                     |                     | Changes resulting from   | Ap 24   |
| Problems                                  | Se 24               | Gases affected by  | Ap 24   |



# SUBJECT INDEX

|   | PAGE                       |   | PAGE  |
|---|----------------------------|---|-------|
| <b>Research (Concluded)</b>                           |                            | <b>Roads and Streets (Concluded)</b>    |       |
| Liquids affected by                                   | Ap 24                      | Lincoln                                 | Mr 25 |
| Solids affected by                                    | Ap 24                      | Problems                                | Mr 25 |
| Standardization relation to                           | Jn 24                      | Trends                                  | Jn 22 |
| Value of  | Ap 33                      | <b>Royal Aircraft Establishment</b>     | Jl 33 |
| (See also Instruments; S.A.E., Research; and Testing) |                            | <b>Rubber</b>                           |       |
| <b>Riding Qualities</b>                               |                            | Creep                                   | Ap 23 |
| Damping, importance of                                | My 17                      | Factors governing use of                | No 36 |
| Factors affecting                                     | My 17, My 18; Jl 20        | Load capacity, factors affecting        | Ap 23 |
| Harshness analyzed                                    | Jl 20                      | Permanent set                           | Ap 23 |
| Human factor  | My 18; Jl 21               | Physical properties                     | Ap 23 |
| Instruments, exhibition of                            | Mr 16; Jl 21, Jl 23        | Slippage                                | Ap 23 |
| Passenger comfort                                     | No 27                      | Stretching                              | Ap 23 |
| Research  | My 17; Jl 21, Jl 26        | Synthetic, Neoprene                     |       |
| Road effects  | My 17                      | Components of                           | De 12 |
| Testing   |                            | Cost                                    | De 12 |
| Instruments for                                       | Jl 26, Jl 29               | Merits                                  | De 12 |
| Vehicle characteristics                               | Jl 26                      | Properties of                           | De 13 |
| Vibration effects                                     | Jl 28, Jl 29               | Rubber compared with                    | De 13 |
| Tire effects  |                            | Uses of                                 | De 13 |
| Design factors  | Jl 20                      | Vulcanization effects                   | Ap 23 |
| Pressure  | Jl 20                      | <b>Rubber Manufacturers Association</b> | My 24 |
| Wear  | Jl 20, Jl 21               |   |       |
| Vehicle design effects                                |                            |   |       |
| Bodies, chassis unit construction with                | My 18                      |   |       |
| Seats   |                            |   |       |
| Cushions  |                            |   |       |
| Damping characteristics                               | Jl 28                      |   |       |
| Requirements  | Jl 26, Jl 27, Jl 28, Jl 29 |   |       |
| Test data   | Jl 26, Jl 27, Jl 28, Jl 29 |   |       |
| Types compared  | Jl 29                      |   |       |
| Vibration   | Jl 28, Jl 29               |   |       |
| Improvement needed                                    | My 17                      |   |       |
| Shock absorbers                                       | My 17                      |   |       |
| Springs, suspension                                   | My 17                      |   |       |
| <b>Rims</b>   |                            |   |       |
| (See Tires and Rims)                                  |                            |   |       |
| <b>Roads and Streets</b>                              |                            |   |       |
| Design  |                            |   |       |
| Car height factor                                     | Jn 22                      |   |       |
| Cost factor   | Jn 22                      |   |       |
| Fundamentals of                                       | Je 36                      |   |       |
| Highway planning surveys, value of                    | Jn 30                      |   |       |
| Improvements made                                     | Jn 30                      |   |       |
| Sight distances                                       | Jn 22                      |   |       |
| Two, three and four-lane types                        |                            |   |       |
| Capacity  | Jn 22                      |   |       |
| Safety factor   | Jn 22                      |   |       |
| Visibility  | Jn 22                      |   |       |
| Foreign   |                            |   |       |
| Inspection tour of                                    | My 34                      |   |       |
| United States compared with                           | No 12                      |   |       |
| Improvements needed                                   | Fe 26                      |   |       |
| Lighting  | Jn 22                      |   |       |
| Road striping   | Jn 23                      |   |       |
| Safety factors  | Jn 22                      |   |       |
| Safety promotion                                      |                            |   |       |
| City  | Ag 26                      |   |       |
| Rural   | Ag 26                      |   |       |
| Snow removal  | Jn 23                      |   |       |
| Traffic   |                            |   |       |
| Accident problems                                     | Jn 30                      |   |       |
| City-planning effects                                 | Jn 33                      |   |       |
| Congestion  |                            |   |       |
| City planning to reduce                               | Je 36                      |   |       |
| Remedies suggested                                    | Je 36                      |   |       |
| Control   |                            |   |       |
| Devices for   | Ag 26                      |   |       |
| Methods and effects                                   | Jn 33                      |   |       |
| Efficiency increase needed                            | My 33                      |   |       |
| Hill-climbing   | Fe 25, Fe 26               |   |       |
| Increase in   | Oc 12                      |   |       |
| Local vs. highway                                     | Jn 23                      |   |       |
| One-way streets                                       |                            |   |       |
| Merits  | Jn 30                      |   |       |
| Two-way streets compared with                         | Jn 30                      |   |       |
| Progress  | My 33                      |   |       |
| Slow-moving, handling of                              | Fe 25, Fe 26               |   |       |
| Tunnel  |                            |   |       |
| Holland   | Mr 25                      |   |       |

## Abbreviations Used:

January, Jn  
February, Fe  
March, Mr

April, Ap  
May, My  
June, Je

## Months of the Year

July, Jl  
August, Ag  
September, Se

October, Oc  
November, No  
December, De

# S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

## S.A.E. (Continued)

|   |  |
|---|--|
| Chassis-assembly contest                        | Jl 24, Jl 25   |
| Engineering displays                            | Jn 19; Fe 16, Fe 17  |
| Inspection trips                                | Jn 13  |
| National Aeronautic                             | Jn 21; Fe 13, Fe 33, Fe 35; Mr 15, Mr 19; Ap 13, Ap 24; Oc 20                            |
| National Aircraft Production                    | Fe 54; My 27; Je 18; Jl 46; Ag 20, Ag 21; Se 12, Se 14, Se 16; Oc 9, Oc 12, Oc 16; No 10 |
| National Fuels and Lubricants                   | Fe 53; Je 18; Jl 46; Ag 20, Ag 21, Se 14, Se 15, Se 16; Oc 16; No 10                     |
| National Passenger Car                          | Jn 21; Fe 13, Fe 33, Fe 35; Mr 15, Mr 20; My 13; No 27                                   |
| National Production                             | Jn 13; My 27; Je 18; Se 24   |
| National Tractor                                | Mr 15, Mr 23; Ap 19, Ap 22; My 23; No 38   |
| National Transportation Engineering             | Je 18; Jl 46; Ag 21; Se 14, Se 16; Oc 12, Oc 16; No 11, No 16; De 10                     |
| Photographic contest and exhibition             | My 40; Jl 33; Ag 20; Oc 13; De 24  |
| Section Regional Tractor                        | Je 18  |
| Section Regional Transportation and Maintenance | Mr 15, Mr 24; Ap 19, Ap 23; Je 19  |
| Sports events                                   | Je 29; Jl 38   |
| Summer  | Jn 21; Fe 33; Mr 15; Ap 19; My 19, My 27, My 40; Je 18; Jl 17                            |
| Truck, Bus and Railcar                          | Jl 46; Ag 21; Se 14, Se 15, Se 16; Oc 16; No 11  |
| West Coast Transportation and Maintenance       | Jn 22; Je 36; Jl 46; Ag 21; Se 14, Se 16; Oc 10, Oc 16; No 16; De 11                     |
| World Automotive Engineering Congress           | Ag 13; Se 13, Se 14, Se 15; Oc 12; De 7, De 16, De 18                                    |
| Membership                                      |  |
| Applicants for membership                       | Jn 29; Fe 52; Mr 29; Ap 25; My 26; Je 25; Jl 43; Ag 24; Se 20; Oc 17; No 17; De 19       |
| Applicants qualified                            | Jn 28; Fe 51; Mr 28; Ap 25; My 25; Je 24; Jl 43; Ag 22; Se 20; Oc 17; No 17; De 19       |
| Bibliofilm service available to                 | Je 30  |
| Classes of                                      | Mr 14  |
| Data on   | My 27  |
| Dues pro-rated                                  | Jl 46  |
| Obituaries                                      | Jn 27; Fe 41; Mr 27; Jl 44; Ag 19; Se 22; Oc 15; De 21                                   |
| Personal notes                                  | Jn 26; Fe 40; Mr 26; Ap 30; My 28; Je 26; Jl 44; Ag 18; Se 22; Oc 14; No 14; De 20       |
| Service, added privileges proposed              | Je 28; Jl 19; No 23  |
| Name  | Mr 14  |
| Officers  |  |
| Nomination                                      | Ap 18; Oc 11   |
| President                                       | Fe 21; Ap 17   |
| Vice-Presidents                                 | Fe 22, Fe 23   |
| Overseas conferences, S.A.E. participation in   | Ap 31  |
| Professional Activities                         |  |
| Aircraft  | Fe 23, Fe 25, Fe 43  |
| Aircraft Engine                                 | Fe 23, Fe 32, Fe 43  |
| Diesel Engine                                   | Fe 22, Fe 35, Fe 43  |
| Fuels and Lubricants                            | Fe 23, Fe 37, Fe 43  |
| Passenger Car                                   | Fe 23, Fe 43; My 14; Jl 19   |
| Passenger Car Body                              | Fe 17, Fe 22, Fe 43  |
| Production                                      | Jn 13; Fe 22, Fe 34, Fe 44   |
| Recognition of                                  | Mr 14, Mr 15   |
| Tractor and Industrial Power Equipment          | Fe 23, Fe 44   |
| Transportation and Maintenance                  | Jn 24, Jn 35; Fe 22, Fe 44; De 10  |
| Truck, Bus and Railcar                          | Fe 22, Fe 25, Fe 44; No 11; De 10  |
| Publications                                    |  |
| Bulletin  | Mr 14  |
| History of                                      | Mr 14  |
| Journal   | Fe 28, Fe 47; Mr 14  |
| Roster  | Fe 47; Mr 27; De 17  |
| Transactions                                    | Fe 47; Mr 14   |
| Research  |  |
| Aims and scope                                  | Oc 7, Oc 8   |
| Fuels   | Fe 45; Oc 12   |
| Function  | Oc 8   |
| Highways  | Fe 45, Fe 48; Oc 12  |
| History   | Oc 7   |
| Ignition  | Fe 48; Oc 12   |
| Lubricants                                      |  |
| Aircraft engine                                 | Fe 48; Mr 18; Je 21  |
| Extreme pressure                                | Fe 44, Fe 47; Mr 16  |
| Oiliness  | Fe 44, Fe 47   |
| Oil stability                                   | Fe 44, Fe 47; Mr 16  |
| Need for  | Oc 7   |
| Organization                                    | Oc 8   |
| Progress  | Oc 7, Oc 8, Oc 12  |
| Riding Comfort                                  | Fe 45, Fe 48; Mr 16; My 17, My 18; Jl 21, Jl 26  |
| Textile   | Fe 48  |
| Wheel Alignment                                 | Fe 48  |
| Wheel alignment committee disbanded             | Mr 18  |
| Scope   | Jn 24; Fe 14; Mr 14  |

## S.A.E. (Continued)

|                                    |  |
|------------------------------------|--|
| Sections                           |  |
| Baltimore                          | Jn 21, Jn 22, Jn 30; Fe 33, Fe 38; Mr 15, Mr 21, Mr 24; Ap 19, Ap 20; My 27, My 30; Je 19, Je 29; Ag 23, Ag 26; Oc 10, Oc 16; No 16, No 36; De 14, De 16   |
| Buffalo                            | Jn 21, Jn 22; Fe 33, Fe 38; Mr 15, Mr 21; Ap 19; My 30; Je 19; Jl 48; Ag 21, Ag 23; Se 14, Se 16; Oc 10, Oc 16; No 16, No 26; De 16  |
| Canadian                           | Jn 21, Jn 22, Jn 30; Fe 33, Fe 38, Fe 39; Mr 15, Mr 21, Mr 22; Ap 19, Ap 22; My 27, My 30, My 34; Je 19, Je 29; Jl 46; Ag 21, Ag 23; Se 16, Se 25; Oc 10, Oc 16; No 16, No 25, No 28; De 14, De 16   |
| Chicago                            | Jn 21, Jn 22, Jn 31; Fe 33, Fe 38; Mr 15, Mr 21, Mr 24; Ap 19, Ap 20; My 27, My 30; Je 19, Je 21; Jl 24, Jl 30; Ag 23, Ag 26; Oc 10, Oc 16; No 11, No 16, No 38; De 16   |
| Cleveland                          | Jn 21, Jn 22, Jn 32; Fe 33, Fe 38; Mr 15, Mr 21, Mr 24; Ap 19, Ap 23, Ap 24; My 27, My 30, My 32; Je 19, Je 31; Jl 24; Ag 23; Se 16; Oc 10, Oc 16; No 16, No 36; De 14, De 16  |
| Dayton                             | Jn 22, Jn 32; Fe 33, Fe 38; Mr 21; Ap 19; My 27, My 30; Je 19, Jl 31; Ag 23; Oc 10, Oc 20; No 16   |
| Denver Club                        | Se 14  |
| Detroit                            | Jn 21, Jn 22, Jn 32; Fe 33, Fe 38; Mr 15, Mr 21; Ap 19, Ap 32; My 27, My 30, My 31; Je 18, Je 19, Je 21; Jl 24, Jl 30; Ag 13, Ag 23; Oc 10, Oc 16; No 16, No 36, No 38; De 13, De 16   |
| History                            | Mr 14  |
| Indiana                            | Jn 21, Jn 22, Jn 30; Fe 33, Fe 38; Mr 15, Mr 21, Mr 23; Ap 19, Ap 24; My 27, My 30, My 34; Je 19; Jl 24, Jl 32; Ag 13, Ag 23; Oc 10, Oc 16; No 16, No 24; De 12, De 16   |
| Kansas City                        | Jn 22; Fe 33, Fe 38; Mr 15, Mr 21; Ap 19, Ap 24; My 27, My 30; Je 19, Je 20; Ag 23; Oc 10, Oc 16; No 16, No 36; De 16  |
| Metropolitan                       | Jn 21, Jn 22, Jn 23, Jn 35; Fe 33, Fe 38; Mr 15, Mr 21, Mr 23; Ap 19, Ap 24, Ap 32; My 27, My 30, My 33; Je 19, Je 28; Jl 24; Ag 13, Ag 23; Se 14, Se 16, Se 25; Oc 10, Oc 13, Oc 16, Oc 20, Oc 21; No 11, No 12, No 16, No 36; De 10, De 16 |
| Milwaukee                          | Jn 21, Jn 22, Jn 30; Fe 33, Fe 38; Mr 15, Mr 21, Mr 22; Ap 19, Ap 33; My 30; Je 18, Je 19; Jl 47; Ag 23; Se 14, Se 16; Oc 10, Oc 16, Oc 21; No 16, No 25; De 12, De 16   |
| New England                        | Jn 21, Jn 22; Fe 33, Fe 38, Fe 39; Mr 15, Mr 21, Mr 24; Ap 19, Ap 24; My 27, My 30, My 32, My 33; Je 18, Je 19, Je 28; Ag 21, Ag 23; Oc 10, Oc 16; No 16; De 13, De 16   |
| Northern California                | Jn 21, Jn 22, Jn 33; Fe 33, Fe 38, Fe 42; Mr 15, Mr 21, Mr 24; Ap 19; My 27, My 30, My 37; Je 18, Je 19, Je 30; Jl 46; Ag 13, Ag 23; Se 14, Se 16, Se 25; Oc 10, Oc 12, Oc 16, Oc 20; No 10, No 12, No 16, No 36; De 11, De 12, De 16        |
| Northwest                          | Jn 21, Jn 22, Jn 32; Fe 33, Fe 38; Mr 15, Mr 21, Mr 22; Ap 19, Ap 32; My 30; Je 18, Je 19; Jl 31, Jl 32; Ag 23; Se 14, Se 16; Oc 10, Oc 12, Oc 16; No 10, No 16, No 25, No 38; De 11, De 16  |
| Officers                           | Ag 23  |
| Oregon                             | Jn 21, Jn 22, Jn 30; Fe 33, Fe 38; Mr 21; My 27, My 30, My 32; Je 18, Je 19; Jl 32; Ag 23; Se 14, Se 15, Se 16; Oc 10, Oc 16; No 10, No 16, No 26; De 11, De 16  |
| Philadelphia                       | Jn 21, Jn 22; Fe 33, Fe 38, Fe 39; Mr 15, Mr 21; Ap 19, Ap 24; My 27, My 30, My 34; Je 19, Je 28; Jl 24; Ag 24; Oc 10, Oc 16; No 16, No 25, No 36, No 38; De 16  |
| Pittsburgh                         | Jn 21, Jn 22, Jn 24, Jn 30, Jn 35; Fe 33, Fe 38, Fe 56; Mr 15, Mr 21, Mr 22; Ap 19, Ap 24, Ap 32; My 27, My 30, My 36; Je 19; Ag 24; Oc 10, Oc 16; No 16; De 14, De 16   |
| St. Louis                          | Jn 22; Fe 38; Mr 21; Ap 19; My 27, My 30; Je 19; Ag 24; Oc 10; De 14, De 16  |
| Southern California                | Jn 21, Jn 22, Jn 23, Jn 32, Jn 35; Fe 33, Fe 38, Fe 56; Mr 15, Mr 21, Mr 24; Ap 19, Ap 21; My 27, My 30, My 34; Je 18, Je 19; Ag 24; Se 14; Oc 10, Oc 16; No 10, No 16, No 28; De 11, De 16  |
| Southern New England               | Jn 21, Jn 22; Fe 33, Fe 38; Mr 15, Mr 21, Mr 23, Mr 24; Ap 19, Ap 24; My 27, My 30, My 35; Je 19, Je 28; Jl 46; Ag 24; Oc 10, Oc 16; De 12, De 16  |
| Syracuse                           | Jn 21, Jn 22; Fe 33, Fe 38; Mr 15, Mr 21, Mr 22; Ap 19; My 27, My 30, My 36; Je 19; Ag 24; Oc 10, Oc 16; No 16, No 36; De 16   |
| Tulsa Group                        | Jn 35; Mr 24; Ap 21, Ap 22; Jl 47; Ag 20; Oc 20; No 36, No 38  |
| Vice-Chairman, additional, Chicago | Mr 24  |

# SUBJECT INDEX

|  | PAGE  |
|--|---|
| <b>S.A.E. (Concluded)</b>  |   |
| Washington   | Jn 21, Jn 22, Jn 24; Fe 33, Fe 38; Mr 15, Mr 21, Mr 25; Ap 13, Ap 19; My 27, My 30, My 36; Je 19, Je 29; Ag 24, Ag 26; Oc 10, Oc 16, Oc 21; No 12, No 16; De 16 |
| Student activities   |   |
| Debate   | No 21   |
| General Motors Institute of Technology                                       | Fe 42; Mr 24; Jl 32; Se 14; Oc 13   |
| New York University  | Ap 32; My 37; Jl 48; De 16  |
| Ohio State University  | Jn 24; Ap 32, Ap 33; Je 29; De 16   |
| Oregon State College   | Ap 32; My 32; Jl 46; No 21; De 11, De 14  |
| Paper competition  | Mr 24; Je 31; Jl 46; De 14  |
| Purdue University  | Jn 32; Ap 20, Ap 24; My 34; Oc 13; No 15  |
| Speaking contest   | De 16   |
| University of Alabama  | Jl 31   |
| University of Detroit  | Ap 23; My 31  |
| University of Michigan   | Je 29; Jl 48; De 26   |
| University of Oklahoma   | Jn 32; Je 28; Jl 48   |
| Value of   | Fe 13; Mr 14; No 12; De 18  |
| (See also Cooperative Fuel Research, and Standardization Activities, S.A.E.) |   |
| <b>Safety</b>  |   |
| (See Accidents and Accident Prevention)                                      |   |
| <b>Screw Threads, Standardization</b>  | Mr 17   |
| <b>Shock Absorbers</b>   |   |
| Importance of  | My 17, My 18  |
| Riding qualities affected by   | My 17, My 18  |
| <b>Six-Wheel Vehicles</b>  |   |
| History  | My 34   |
| Problems   | My 34   |
| Weight-distribution importance   | My 34   |
| <b>Society of Aeronautical Engineers</b>                                     | Ag 16   |
| <b>Society of Tractor Engineers</b>  | Ag 16   |
| <b>Springs, Suspension</b>   |   |
| Camber, truck chassis height relation to                                     | No 25   |
| Coil, merits   | Fe 39   |
| Helical  | My 17   |
| Leaf   |   |
| Cost factor  | Jl 30   |
| Efficiency, factors affecting  | Jl 31   |
| Improvement, factors involved in   | No 38   |
| Inserts  |   |
| Material used  | My 17   |
| Trends   | My 17   |
| Progress   | Jl 30; No 38  |
| Load variation effects   | De 25   |
| Magnaflect suspension  | De 25   |
| Progress   | Jl 30; No 38; De 16, De 25  |
| Rubber used in   | My 17   |
| Standardization  | Mr 17   |
| Torsional  | My 17   |
| Torsion-rod suspension   | De 25   |
| Trends   | De 25   |
| Types analyzed   | My 17; No 28  |
| Variable rate, methods of obtaining  |   |
| Progressive  | De 25   |
| Two-stage  | De 25   |
| <b>Standardization</b>   |   |
| Definition   | Jn 24; Ag 14  |
| Function of  | Jn 24   |
| History  | Jn 24   |
| Human element  | Jn 24   |
| Importance of  | Fe 56   |
| International  | Ag 16   |
| Progress   | Se 25   |
| Research relation to   | Jn 24   |
| Value of   | Ag 14; Se 25  |
| (See also Standardization Activities, S.A.E.)                                |   |
| <b>Standardization Activities, S.A.E.</b>                                    |   |
| Ball and roller bearing  | Jn 20   |
| Character of   | Ag 14   |
| Committee  |   |
| Appointments   | Ap 30   |
| Membership   | Fe 45   |
| Report   | Fe 50   |
| Standards approved by  | Ag 15   |
| Cooperation with outside agencies  | De 17   |
| Division reports approved  | Mr 17   |
| Electrical equipment   |   |
| Ratings  | Jn 20   |
| Storage batteries  | Mr 16   |
| Voltages for Diesel engines  | Mr 16   |
| Example given  | Ag 15   |
| Glass, safety  | Jn 20   |

|   | PAGE   |
|---|--|
| <b>Standardization Activities, S.A.E. (Concluded)</b> |  |
| Handbook  | Jn 20; Fe 51; Mr 14, Mr 16, Mr 17, Mr 18; Je 21; Ag 15; Se 25; Oc 10, Oc 13; De 17 |
| History   | Jn 24; Mr 14; Ag 14  |
| Inception   | Mr 14  |
| International   | Ag 16  |
| Iron and steel  |  |
| Revision of   | Mr 16  |
| Specifications  | Jn 21  |
| Lighting, revision of                                 | Mr 16  |
| Limits and tolerances                                 | Jn 21  |
| Lubricant   |  |
| Classification, new                                   | Mr 18  |
| Oil filter mountings                                  | Mr 23  |
| Reclassification recommended                          | Jn 20  |
| Transmission  | Mr 17, Mr 18   |
| Nomenclature  | Oc 13  |
| Parts and fittings, twist drills                      | Jn 20  |
| Progress  | Ag 14, Ag 16; Oc 13  |
| Revisions   | Oc 13  |
| Screw thread  | Mr 17  |
| Springs, suspension                                   | Mr 17  |
| Steel quality influenced by                           | Je 21  |
| Tractor, revision of                                  | Mr 17  |
| Trailer   |  |
| Coupling  | Mr 17; Ag 15; Oc 10  |
| Data plate  | Mr 17  |
| Value of  | Ag 14; No 38   |
| <b>Steels</b>   |  |
| Hollow, aircraft propeller use                        |  |
| Vibration factor                                      | Ap 27  |
| Weight factor   | Ap 26  |
| Quality control                                       |  |
| Requirements  | No 38  |
| S.A.E. Standards influence on                         | No 38  |
| S.A.E. standardization effects                        | Je 21; No 38   |
| Stainless   |  |
| Aircraft use of                                       | No 18  |
| Future predicted                                      | Fe 55  |
| Merits  | No 18  |
| Standardization                                       | Mr 16  |
| <b>Streets</b>  |  |
| (See Roads and Streets)                               |  |
| <b>Supercharging</b>                                  |  |
| Aircraft  |  |
| Altitude performance                                  | Jl 35  |
| Diesel, test results                                  | Fe 35  |
| Exhaust-driven vs. gear-driven                        | Jl 35  |
| Exhaust-turbo type                                    | Jl 35  |
| Gear-driven vs. exhaust-driven                        | Jl 35  |
| Installation problems                                 | Jl 35  |
| Size trends   | Jl 35  |
| Automobile, example given                             | Jn 34  |
| Diesel engine   |  |
| Brake mean effective pressure affected by             | Fe 35  |
| Combustion shock decreased by                         | Fe 35  |
| Cost factor   | Oc 19  |
| Design affected by                                    | Fe 35  |
| Engine-size factor                                    | Fe 35  |
| Field for   | Mr 25  |
| Fuel consumption affected by                          | Fe 35; Oc 19   |
| Future predicted                                      | Mr 25; Oc 19   |
| Operation improved by                                 | Mr 25  |
| Power affected by                                     | Oc 19  |
| Test results  | Fe 35  |
| Types of  | Oc 21  |
| Weight affected by                                    | Fe 35  |
| Fundamentals of                                       | No 27  |
| Test program outlined                                 | My 16  |
| <b>T</b>  |  |
| <b>Tennessee Valley Authority</b>                     | Je 19  |
| <b>Testing</b>  |  |
| Aircraft  |  |
| Flying boat   | Ag 12  |
| Flying model used                                     | Ag 12  |
| Axles, rear   | No 38  |
| Cooperative Universal Single-Cylinder Test Engine     |  |
| Development of  | No 36  |
| Mechanical features                                   | No 36  |
| Uses  | No 36  |
| Engine  |  |
| Instrumentation                                       |  |
| Cost factor   | De 24  |
| Need for  | De 24  |
| Single-cylinder engine developed for                  | My 33; No 36   |
| Fuels, Diesel   | Fe 34  |



## S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

|  | PAGE                |                                    | PAGE  |
|--|---------------------|------------------------------------|---|
| <b>Testing (Concluded)</b>   |                     | <b>Transmissions (Concluded)</b>   |   |
| Laboratory methods and equipment                                       | Jn 31               | Four-wheel drive                   |   |
| Laboratory testing machines classified                                 | Ag 26               | Design problems                    | Jl 32   |
| Lubricant, extreme-pressure  | No 21               | Failure causes                     | Jl 32   |
| Methods and equipment  | Jn 31               | Foreign usage                      | No 12   |
| Riding qualities   |                     | Merits                             | Jl 31   |
| Instruments for  | Jl 26, Jl 29        | Motor-truck                        | Jl 31, Jl 32                                    |
| Vehicle characteristics  | Jl 26               | Future predicted                   | My 16   |
| Spark plugs, single-cylinder test engine used                          | My 33               | Hydraulic                          | De 24   |
| Transmissions  | No 38               | Lubrication                        |   |
| (See also Detonation, Testing; Fuels, Diesel, Rating; and Instruments) |                     | Requirements                       | Jl 42   |
| <b>Tires and Rims</b>  |                     | Standardization                    | Mr 17, Mr 18                                    |
| Balance  | Jn 34; Fe 30        | Makes, Mono-Drive                  | My 35; No 28                                    |
| Cost decrease  | Ap 21               | Motorcoach                         | No 28   |
| Cotton vs. rayon   | Fe 30               | Motor-truck                        | Jl 31, Jl 32                                    |
| Design developments  | Je 36               | Progress                           | My 16; No 27; De 16                             |
| Entrapped air  |                     | Tests, deflection                  | My 23; No 38                                    |
| Cause  | Jn 34               | Trends                             | No 27   |
| Remedy   | Jn 34               | Underdrive                         | My 16   |
| Failure causes   | Fe 30               | (See also Electric Drive)          |   |
| Life   |                     | <b>Transportation</b>              |   |
| Automobile   | Fe 29               | History                            | Ap 20   |
| Motorcoach   | Fe 29               | Progress                           | Ap 20, Ap 21                                    |
| Motor-truck  | Fe 29               | Railroad                           |   |
| Load carrying capacity   | Jn 34               | Automotive engineering cooperation | Fe 13, Fe 14; Se 15                             |
| Mileage  | Fe 29; Ap 21        | Diesel trains                      | Jn 22; Ap 21; Je 36; No 11, No 22               |
| Motorcoach, mileage  | Fe 29, Fe 30        | Streamlined trains                 | Jn 22; Ap 21; My 35; Je 36; No 11, No 22, No 28 |
| Motor-truck  |                     |                                    |   |
| CCC operation  | Fe 30               | <b>Truck</b>                       |   |
| Dual and single compared   | Ap 32               | (See Motor-Truck)                  |   |
| High vs. low-pressure  | Fe 29               |                                    |   |
| Mileage  | Fe 29               |                                    |   |
| Oil field usage  | Ap 32               |                                    |   |
| Sizes  | De 10, De 23        |                                    |   |
| Uses, special  | Fe 30               |                                    |   |
| Noise reduction  | Jn 34               |                                    |   |
| Progress   | Jn 34; Ap 21; Je 36 |                                    |   |
| Rayon  |                     |                                    |   |
| Cost factor  | Jn 34               |                                    |   |
| Cotton compared with   | Fe 30               |                                    |   |
| Heat effects   | Jn 34               |                                    |   |
| Merits   | Jn 34               |                                    |   |
| Recapping  | Fe 30; Ap 32        |                                    |   |
| Retreading   | Jn 35; Fe 30; Ap 32 |                                    |   |
| Riding qualities affected by   | Jl 20, Jl 21        |                                    |   |
| Selection, factors affecting   | Fe 29, Fe 30        |                                    |   |
| Sizes  |                     |                                    |   |
| Intervals between  | De 10, De 23        |                                    |   |
| Large  | Jn 34               |                                    |   |
| Motor-truck  | De 10, De 23        |                                    |   |
| Range of   | De 23               |                                    |   |
| Recommendations  | De 23               |                                    |   |
| Sizing, present system   |                     |                                    |   |
| Criticism of   | De 23               |                                    |   |
| Defense of   | De 23               |                                    |   |
| Establishment of   | De 23               |                                    |   |
| Temperature, factors affecting   | Ap 32               |                                    |   |
| Tractor, water addition effects  | Jn 34               |                                    |   |
| Wear, factors affecting  | Fe 30; Jl 20, Jl 21 |                                    |   |
| <b>Tire and Rim Association</b>  | De 23               |                                    |   |
| <b>Tractors, Farm</b>  |                     |                                    |   |
| Standardization, specifications revised                                | Mr 17               |                                    |   |
| Tires  |                     |                                    |   |
| Pneumatic, merits of   | My 24               |                                    |   |
| Water addition effects   | Jn 34               |                                    |   |
| Trends   | My 23, My 24, My 37 |                                    |   |
| Usage extent   | My 38               |                                    |   |
| <b>Traffic</b>   |                     |                                    |   |
| (See Roads and Streets)  |                     |                                    |   |
| <b>Trailers</b>  |                     |                                    |   |
| Coupling standardization   | Mr 17; Oc 10        |                                    |   |
| Data plate standardization   | Mr 17               |                                    |   |
| <b>Transmissions</b>   |                     |                                    |   |
| Automatic  |                     |                                    |   |
| Control  | My 35               |                                    |   |
| Criticism of   | My 16               |                                    |   |
| Inspection trip to manufacturing plant                                 | Mr 24               |                                    |   |
| Merits   | Fe 39; My 16, My 35 |                                    |   |
| Need for   | No 28               |                                    |   |
| Problems   | My 16               |                                    |   |
| Production equipment   | Jn 25; Se 24        |                                    |   |
| Usage extent   | My 16               |                                    |   |
| Control, remote  | My 16               |                                    |   |
| Deflection tests   | My 23; No 38        |                                    |   |
| Design trends  | De 16               |                                    |   |
| Four-speed   | My 16               |                                    |   |



E

2  
2  
2  
I  
2  
6  
4

2  
8  
8  
8  
2  
6  
8  
7  
6

0  
I

5  
2  
;  
8

;  
5  
8

2  
2

8

2

8

2

2

8

2

2

8

2

2

8

2

2

8

2